Lankhills Methods: with Schemes of Work

THE EDUCATION OF THE ORDINARY CHILD

by

JOHN DUNCAN

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Foreword by
DR. W. P. ALEXANDER

The *ordinary* child whose education is considered in this book is the child who does not excel at bookish or verbal activities, but who will one day be one of the nine people out of every ten who earn a living by using their practical ability—their "common-sense."

In the past the education of these children has been largely borrowed from that of their more verbal-fellows—with the result that the strong practical abilities of the *ordinary* children have not been fully utilised.

In this book the author shows a different way. Lankhills is known to thousands of people as a school where remarkable results have been achieved with the least verbal of all children. Mr. Duncan shows how the practical methods used so successfully with these children can be adapted to meet the needs of *ordinary* children—in the C, B, and A stream classes of the Senior Schools. Schemes of work are given in full, explained and illustrated so that the non-specialist teacher can use them easily. Methods of grading are described, and a straightforward account is given of the way in which tests of intelligence and attainment can be brought out of the field of theory into that of the teacher's regular practice.

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JOHN DUNCAN

With a Foreword by

DR. W. P. ALEXANDER, ED.B., M.A., B.Sc.

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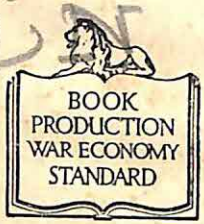

THIS BOOK IS PRODUCED IN COMPLETE
CONFORMITY WITH THE
AUTHORISED ECONOMY STANDARDS

First published 1942

FOREWORD

I SUPPOSE it is true one of the outstanding characteristics in educational discussions during the last few years has been an increasing stress laid on a recognition not merely as in the Hadow Report of different degrees of ability, but of different types of ability. In particular, there has been an increasing recognition that there were some children who, although not able to make normal progress in academic work, when approached in a practical way achieved standards of work of a reasonably high order and in some cases of a surprisingly high order. Those of us who have written and spoken on this subject are constantly faced with the obvious question—to set out in some detail exactly how to make this practical approach. Here, in Mr. Duncan's book, I feel sure, is the answer to that question. He is head master of a school which has made a notable contribution in working out in detail practical methods which have more than a theoretical sanction because they have been proved to be successful, as all those who have visited Lankhills School can testify ; and, most interesting of all, methods proved successful with children who were not merely backward when approached on the academic side, but who were so backward and so dull as to be certifiable under the Education Act of 1921.

It may be that because of the great work that has been done at Lankhills Special School there are some who will think this book is suitable only for teachers in Special Schools. May I say to such people that the methods which have been proved so successful at Lankhills in my opinion are the most excellent methods for the ordinary child in the ordinary school. Is it not true that the vast majority of people live practically, have to make practical judgments about practical things, and spend far more of their life doing things than talking about them or writing of them ? If this be true—and I am certain it is true—then surely education itself is a practical thing. The stress in the Education Act on the three Rs has, perhaps, inevitably resulted in the development in our schools of a verbal approach ; indeed there are some who would define education in terms of words and books. That phase, however, is passing and increas-

ingly the country looks to its schools to provide a broad living experience for the pupils, ensuring an adequate preparation for communal life in a democratic community; and for that purpose a practical approach is of the very essence of sound educational method.

I myself am especially grateful to Mr. Duncan for having written a book in which there is set out clearly and with the necessary detail to make it of great value to teachers the methods he has adopted with such success in the whole range of subjects of the curriculum. The scope of the book is considerable. The basis on which the curriculum and methods developed in Lankhills rest has been set out; the methods of locating in a school those children for whom practical methods are imperative are given in simple and direct fashion; the detailed syllabuses which have proved so successful and which have taken years to develop are made available to teachers; the illustrations are adequate to enable a teacher to develop a scheme with the same basic principles, making such adjustments as may be necessary to the abilities of the particular children under his or her care. When, some years ago, I ventured to set out certain principles of education which seemed to me to be the basis on which the problem of the education of the backward child must rest,[1] I greatly hoped that someone appropriately qualified and experienced would follow with a book in which was explained how to carry into effect these principles. Mr. Duncan has written such a book and I commend it most cordially to the great body of teachers who daily face the problem of educating children many of whom suffer educational handicap if kept to academic methods within an academic curriculum, and to all students in training who will subsequently face these problems.

Many books have been written on the subject of the backward child. The problem has been carefully diagnosed; the nature of the problem has been made clear; the proportions measured. Mr. Duncan's contribution is appropriate at this stage. He offers a solution based on sound educational principles and proved by successful application over a period of years.

SHEFFIELD, *March* 1942 W. P. ALEXANDER

[1] See *The Educational Needs of Democracy* (University of London Press).

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AUTHOR'S NOTE

I REGRET that it is not possible to mention individually all the people who have so kindly assisted in the production of this book. Any merit the book may have is due to the efforts of many people. Its shortcomings are due to my own limitations.

I acknowledge with grateful thanks the permission of the Hampshire Education Authority, in whose service I am, to publish this book, and the help and encouragement received from its members and officers, which have made the publication of this book possible.

I am deeply indebted to Dr. W. P. Alexander for his work in research, which has given direction for the later developments at Lankhills School ; for his interest and encouragement over some years, and for his help in the production of this book.

My colleagues at Lankhills School have made definite contributions to the book, which are noted in the first chapter. For this and for their loyal team-work extending over many years, I wish to express my gratitude.

LANKHILLS, *June* 1942

J. D.

Chapter I

INTRODUCTION

1. There is no agreement among teachers, psychologists, politicians, and philosophers as to the *purpose* of education, nor is there any agreement as to what *constitutes* education. If the purpose is to train good citizens, we are faced with the fact that conceptions of good citizens differ in different countries—and may be Nazi, Communist, or Christian. The *Encyclopaedia Britannica* defines " Education " as " an attempt by the adult members of a human society to shape the development of the coming generation in accordance with its own ideals of life ". This seems an unsatisfactory definition because (*a*) it is a definition of training rather than of education, and (*b*) the rising generation will live in the world of to-morrow.

Dr. Cattell [1] defines education as follows :

> Logically, education is an applied branch of the pure science of psychology. On the one hand we have the individual child : on the other, the body of learning and ideals with which he is to have fruitful relations. The old-fashioned teacher forgot about the first half of the proposition altogether. The modern educator realises that progress must be based on a scientific understanding of the emotional and mental make-up of each mind, on the laws of human development, and a precise knowledge of the limits of human variability.
>
> But many who realise that psychology is the basis of this half of the educator's problem are not prepared to think that it has any voice in educational ideals. It can choose the means but not the ends.

Whatever definition we accept of education and of the purpose of education, it will be coloured by our own philosophy of life. There appears to be a need for each one of us to define our own ideals and purposes. We may then hope for the good fortune to be able to realise them in part.

The writer's own personal belief is that the attainment by each child of his maximum potential intellectual efficiency through the cultivation of good mental habits would result in an increased measure of human happiness. There is perhaps nothing new in this, for many will see in this belief merely a

[1] *Human Affairs*, ed. Cattell, Cohen, and Travers (Macmillan).

variation of a Greek conception of happiness. This belief, held by a teacher, gave rise to a personal problem. " What means can be evolved that will result in each child's attaining the maximum possible intellectual efficiency? " The problem has been tackled in a restricted sphere, latterly among a group of children whose mental powers are so limited that only by exercising them at their maximum efficiency can they hope to attain any real happiness. The attempt at solution has been along the lines indicated by Dr. Cattell—by studying the child and by trying to use the knowledge that psychologists have made available.

2. Sir Frederick Mander, in his preface to *The Educational Needs of Democracy*,[1] draws attention to a view that the overriding aim of the teacher is " the matching of capacity by attainment ".

The Education of the Ordinary Child is an attempt to present an educational approach that will assist in the achievement of this aim. It is not merely theoretical but is an account of practice based on theories.

3. Education has been passed down from above, and hitherto attempted chiefly through the medium of words. We believe that it should be built up from below, and that for the majority it should be chiefly through the medium of the concrete, the visual, and the everyday.

4. In the past there has been some confusion between instruction and education, and between teaching and learning. We have tried to clarify these terms.

5. Although much of this book is an account of educational development in a Special (M.D.) School, it is thought that the book will be helpful mainly to teachers in Senior Schools and to students in Training Colleges and Training Departments. The conditions under which the development took place, and the methods that were used, are factors that have resulted in standards of work and " even more important, in an attitude of the children, that are not those of mental defectives ".[2]

6. (*a*) In each of the three years preceding the outbreak of war a number of Short Courses for class teachers and Conference

[1] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).

[2] *Ibid.*

Courses for head teachers in the county were run voluntarily at Lankhills by the school staff.

(*b*) In 1938 and 1939 a number of Lecture Demonstrations, each in the teaching of one subject, were held at the school. About thirty county teachers attended each.

(*c*) Each year for some years, many hundreds of visitors have come to Lankhills. Most of them were teachers or students, but among them were many administrators, Government officials, directors of education, university professors and lecturers, and some Ministers of Education, from this country, from the Dominions, and from foreign countries. All had one thing in common. All were interested in education, and desired educational progress. These many contacts, running into thousands, resulted in demands that, because of their number, could not hitherto be met ; namely, for cyclostyled copies of schemes of work and of memoranda as prepared for the teachers who attended Courses.

7. Much of the present book consists of these memoranda and schemes. One hesitates to publish schemes of work. Schemes of work developed in one school are not suitable, as they stand, for use in another school. There is fortunately no uniformity of schools in England. Moreover regimentation is to be deplored, for it is the quickest way of stifling intellectual growth. Without the schemes, however, and without the definite examples of types of exercise that have actually been used, this book would not be very helpful, for it is not enough to state theories and generalities. The schemes are intended to be suggestive and not comprehensive. They have been developed gradually over a period of years, in the light of our gradually increasing knowledge of children. They are not static, and represent merely the stage reached at the present time. Many teachers who have wished to introduce into their schools activities on the lines of some of these schemes have said that they did not know how to begin. For this reason the growth and development of activities in some subjects (*e.g.* Handwork—paper and cardboard work) are traced from the beginning, so that those who wish may follow.

8. (*a*) The Schemes of Work given in this book in the *practical* subjects may be found suitable without modification for use with C and B children in Senior Schools. With some

extension of content they may be suitable for A children. The practical ability of the children at Lankhills has been found to be but very little inferior to that of average children. In more exact language, one might say that the mean level of practical ability of these feeble-minded children almost coincides with the line of middle ability of the general child population. The subjects in which this type of ability is brought into play are : Handwork, Woodwork, Needlework, Art (part), the Domestic Subjects, Physical Training, Country Dancing. The attainments of Lankhills children in these subjects, as would be expected, are similar to those of average children in the ordinary schools.

(*b*) The Schemes of Work in the " academic " subjects—English and Arithmetic—may be found useful by teachers working with feeble-minded children elsewhere, or with poorer C children in Senior Schools, and perhaps with some junior children. The level of intelligence of the Lankhills children is that of the four or five dullest children in C classes. Potentially and actually their attainments in these subjects are vastly inferior to those of average children.

9. This book is the outcome of team-work by the Lankhills staff. My colleagues Mrs. L. A. Bartlett (Handwork), Miss M. Cunniffe (Needlework), Miss J. C. Foster (Art and Physical Training), Mrs. I. A. Lambert (Domestic Subjects), the late Miss D. L. Williams (Music and Country Dancing), Miss D. M. Crosby (Music and Rhythmics), and Mr. N. F. Goater and Mr. N. A. A. Terry (Woodwork), are responsible wholly or in part for the schemes in these subjects. They are specialists who have studied children before subject, and who have regarded their subject as part of a whole curriculum of related subjects.

Chapter II

LANKHILLS SCHOOL AND CHILDREN

This book would be incomplete without some picture of Lankhills School. The background must be filled in if the rest is to be seen in right perspective.

Lankhills is a Special Residential (M.D.) School provided by the Hampshire Local Education Authority for children who have been certified as feeble-minded within the meaning of the Education Act. All our readers will be familiar with the general issue of boarding school versus day school. There is much to be said for both. When, however, the issue is narrowed to schools for children who are intellectually very dull, a boarding school appears to have overwhelming advantages. The parents of dull children are often themselves dull, and make a poor living. Many of their homes show conditions of poverty, overcrowding, and emotional stress. In marked contrast to such conditions are the planned environmental conditions of a residential school, where the food, clothing, sleep, cleanliness, and recreation arrangements are within the control of the school authorities. We would stress the point that the educational developments outlined in this book have taken place in an exceptionally advantageous environment. Many of our colleagues in the day schools doing devoted work with dull children (including the feeble-minded) are hampered by the adverse home conditions under which the children live.

Against the advantages afforded by residence one must, however, weigh some disadvantages. Teachers who work in residential schools will point out, we believe rightly, that supervision duties and domestic difficulties sap much energy that might otherwise be used in the classroom and in preparation. Also the provision of a good environment is only the prelude to education, and the best conditions in the world will not result in attainments matching abilities unless suitable methods of education are used.

In this chapter some particulars are given of the physical aspect of Lankhills. It is difficult to be factual and to " give

particulars " of the emotional environment, so an attempt has been made to present some glimpses of the school and of the children. Readers who are not especially interested in the material aspect of a residential school will perhaps wish to read " The Lighter Side " at the end of the chapter.

1. Buildings

The buildings consist of two large houses about eighty years old, which serve as hostels for 48 boys and 53 girls respectively. Between them stands a dining-hall and kitchen block built in 1928. At the time this was built the stables of the boys' house were reconditioned to form two classrooms and a practical work-room. Adjoining the stables two new semi-open-air type classrooms were added. The stables of the girls' house were transformed into a small power laundry and a room for the girls' laundrywork classes.

The buildings stand in about 11 acres of ground in what an estate agent would describe as " a convenient situation ", five minutes' walk from the railway station and twelve minutes' walk from the centre of the town. The situation is of importance on account of children travelling at holiday times, and on account of domestic staffing. The 11 acres of ground are composed of a considerable area of shrubbery and drives, about 2 acres of kitchen garden, a playfield for the boys which is on the small side, and one for the girls that is definitely too small.

There is no day-room accommodation, no gymnasium, no assembly hall, no sick-room accommodation for boys, and one small sick-room, without conveniences, for girls. The dining-hall is the only large room in the school, and is occupied at four meals a day, for eighteen lessons a week (gymnastics, music, rhythmics, dancing), and for the girls' recreation in all dark or wet weather. It is vacant for a daily period that is barely sufficient for cleaning. The lack of another large room is a factor governing the school time-table. The boys use the classrooms for recreation in wet weather and on winter evenings.

Despite limitations of accommodation, the adaptation of the old buildings has been made with thought and care, and a

smooth-running school has been made possible. The buildings have no beauty, but the grounds, with many fine trees and shrubs, form a very pleasant setting.

2. The School Population

All the children who reach Lankhills have been certified as feeble-minded within the meaning of the Education Act. The number of children in Hampshire so ascertained has remained for some years at a level of about 400. The probable incidence of 4% of the total school population in rural areas (found by the Wood Committee) indicates that probably there are 1600 feeble-minded children in the county. The natural tendency for teachers is to put forward for mental examination only those children who show marked defect, either by educational backwardness or by behaviour that indicates social maladjustment. The well-behaved higher grade feeble-minded children are usually not put forward for examination. They are sometimes overlooked in rural schools, where in any case the average level of intelligence is generally below normal; they are sometimes regarded with sympathy — "He's such a good boy, and he draws well"—and the label of feeble-minded is regarded as a stigma. The 400 children who have been ascertained out of the probable total of 1600 for the whole county are certainly *selected*, but the criterion for selection is generally that they are both educationally and emotionally the poorest of the whole group. Of these 400 ascertained children, 101 are at Lankhills. Admission to the school is dependent on parental consent. Consent can rarely be obtained in the case of girls if they are useful in the home, and in the case of boys if they are well-behaved at home. There is therefore again a further sifting of the 400, through which 101 children pass—the lower grade, the difficult, the delinquent ones. These form the Lankhills population. The number of cases in which parental consent is forthcoming is barely sufficient to keep the school filled. These facts are given because many visitors to the school, after seeing and chatting with the bright-looking, friendly, and responsive children they meet here, have said, "Of course, they're not defective" or "They are highly selected".

Many of our day-school colleagues have told us of children in their schools " far worse than these at Lankhills ". Investigation of these " far worse " children has revealed in an odd case or two an ineducable child who should be (and is then) notified by the L.E.A. to the Local Authority, and excluded from school and dealt with under the Mental Deficiency Act. But the vast majority of the children alleged to be " worse " are found to be of too high an intellectual level to be certified, and not " worse ", but " too good " for the Special School.

The influence of the environment is great, but we believe that the provision of an education that enables children to develop fully such abilities as they have contributes to human happiness.

Dr. Alexander has said :

> Some of these children who have been certified mentally defective are able, before they leave Lankhills, to do invisible jointing in wood ; they can do a series of folk dances with poise and rhythm and without a trace of mistake ; from written instructions they can make cardboard models of, for example, a garage ; they can take measurements of an actual piece of furniture, reduce it to scale, make a cardboard model and then a model in wood—and so on. The standard of work produced and, even more important, the whole attitude of the children are not those of mentally defectives ; nor, in fact, are they defective in terms of g and F.[1]

The provision of a good physical environment has made the full development of innate abilities a *possibility*, but it is on the educational activities that the *realisation* of this possibility depends. Our readers will remember that Stephen Leacock in his essay *Oxford as I See It* compares Oxford with American universities, and attributes the success of the student at Oxford to " sleeping in the ivy ". Some of the visitors to Lankhills attribute the emotional development of the children to " something that lives in the grounds ". The growth of what appears to be the least promising of human material into boys and girls who are well poised physically and mentally, independent, alert, and with an inward urge to be busy, we ourselves attribute to education on what we are going to call gF lines.

[1] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).

3. Diet

Some particulars of the pre-war diet have been published elsewhere.[1] The dinners and teas were planned for variety on a cycle of 28 days. The daily content per head of first-class proteins (from animal sources) was 62 grammes. It was not a minimum diet, but one, we believe, approaching the optimum. The B.M.A. minimum diet for children of this average age gives only 37 grammes of first-class proteins per day. The calorie intake (bread and fats were unrestricted in quantity, and certain dishes variable) showed a mean range of intake varying from 3100 per head in summer to about 3500 per head in winter. (Bigger children, of course, eat more, and smaller children less.) The diet was planned for balance, and it provided, as far as we can judge, all the necessary vitamins.

In ordinary language, there was a hot breakfast every morning, consisting of bacon and tomatoes (obtained all the year round), or sausages, or kippers, or liver. On one morning per week no meat or fish was provided, sweetened oatmeal porridge with plenty of milk, and unlimited quantities of jam, synthetic honey (with a D vitamin content), bread, margarine, and some fresh fruit, being substituted. For dinners were provided hot meat (roast, boiled, stewed beef or mutton, or steak and kidney pies or puddings, hot-pots), two fresh vegetables, and a sweet. Dishes recurred in the 28 days, but not on the same day. In the 28 days there were 22 different kinds of puddings, and there was a summer-winter variation. For tea there was always something " interesting "—cheese and salads of different kinds, or brawn made at school from fresh beef, or scones or cakes. Boiled sweets appeared, as part of the diet, twice a week. For supper the children had new milk, and bread, and a delicious dripping that contains the same fat-soluble vitamin content as summer butter. All the bread was wholemeal (stone-ground flour). The cost was comparatively low, ranging in the few years before the war from 5s. 2d. to 5s. 10d. per head per week.

[1] *The Medical Officer*, 9th July 1932; *The Health of the School Child*, Annual Report of the Chief Medical Officer of the Board of Education, 1931 (H.M.S.O.).

4. Growth

With such a diet, the rate of growth was, as might be expected, rapid. Statistics of the growth have already been published.[1] It is difficult to make comparisons, because the mean height, weight, and growth of children differ from one locality to another. Dr. Cyril Burt [2] has given figures showing the mean heights and weights by age groups of children who are (*a*) normal, (*b*) dull and backward, (*c*) mentally defective ; the means for each age group show generally a decline from (*a*) to (*c*). The mean heights and weights for a period of ten years of all the age groups at Lankhills are very much higher than those given by Dr. Burt for normal London school children. It is believed, however, that Hampshire school children generally are taller and heavier than London school children generally. Unfortunately figures for Hampshire Elementary School children are available only for two age groups—11 years and 12 years. Comparison of these with the Lankhills figures reveals (*a*) that in both these age groups the Elementary School children are taller and heavier than the Special School children, and (*b*) that the inferiority of the Special School children in the 11-year-old group is considerable ; in the 12-year-old group the inferiority is very slight. In other words, there is among the Special School children an accelerated rate of growth which results in their catching up.

The means for the three oldest age groups at Lankhills are greater by $1\frac{1}{2}$–2″ in height and by 6–9 pounds in weight than the means found for a very large group of Elementary School children by the Anthropometric Committee in 1927. We must note, however, that not only are there local differences in means, but there are also differences due to time. The tendency for some years has been for boys and girls to grow taller and heavier, and our figures are of measurements later than 1927.

5. Recreation

Out of doors the boys play football and cricket. The younger boys play in local leagues, and in the last twelve months have won the cups for both games. The older boys play

[1] *Mental Deficiency*, by J. Duncan (Watts) ; *The Medical Officer*, 9th July 1932.
[2] *The Backward Child*, by C. Burt (University of London Press).

teams of local youths. The girls play stoolball and netball. Each year an athletic sports meeting is held after training for six weeks. Happy features of the school are the mixed training (boys and girls) for sports, and occasional mixed stoolball matches. Some boys and girls have garden plots on which they work in their spare time. In fine weather the children always play out of doors. In winter the girls have the use of the dining-hall for their recreation. It is a room 70 feet by 23 feet. They dance (country dancing or ballroom dancing) or play organised group games (Board of Education P.T. syllabus). On some evenings they are busy with individual activities, knitting or sewing to make garments for small brothers or sisters at home with materials they have bought, or playing table games—ping-pong, cards, draughts, dominoes, ludo, snakes and ladders—or doing jigsaw puzzles, or reading, or listening to a radio programme. The boys' activities in winter are unfortunately restricted by the lack of a large room. They use the classrooms and play similar games to the girls, with the addition of darts and shove-ha'penny. Occasionally the smaller boys have the use of the dining-hall for group games and the bigger boys for a very strenuous game resembling rugger, a game which they call, aptly enough, " rough and tumble ". Care is taken not to over-organise the recreation. There is much freedom for children to please themselves.

6. Sleep

All children go to bed at about 8 P.M. They retire in leisurely fashion, chatting happily until bidden " Good-night ". They rise at 6.45 A.M. Many of our colleagues in the day schools hold a view that in poor overcrowded homes the lack of real rest and of sound sleep is a much greater obstacle to efficient education than is poor feeding. Others have pointed out that in such homes it is not just a matter of sleep but a waking daytime atmosphere of emotional stress, of friction, that causes emotional disturbance in the children and militates against concentration on school work.

7. Cleanliness

The boys at Lankhills have a warm shower bath every day (older boys before breakfast, younger boys before supper).

The girls have warm baths twice a week; their bathing is limited by the facilities provided. Personal washing takes place three times a day (twice if bathing). The boys' bathroom is always open, and many of the bigger boys prefer to bath instead of washing after playing games in the evening. For many years now the captain of the football team has obtained from the sewing maid on the day of a match a set of towels for the visitors. At one time few boys visiting availed themselves of the opportunity to bath, but now most do so. Winchester is an old city in which almost exactly half the houses have no bath-rooms!

8. Glimpses of the Lighter Side

(*a*) It is September. A fortnight ago when the children returned from holiday, six small new boys arrived. Last evening my wife took them round the school grounds and shrubberies "wooding". This word will need no explanation to those of my readers who live in woodland country, for to them a familiar sight is a group of small, and usually grubby and happy, urchins wheeling an old perambulator stacked high with dead brushwood. For this expedition an old perambulator was, unfortunately, not available, so two wheelbarrows had to suffice. Later in the evening my wife told me that the small boys had chatted away happily ("Used to do this at home, miss") and had regaled her with stories of their homes, of their brothers and sisters, and of the inevitable babies. All Lankhills children seem to have at all times a baby brother or sister at home! The tit-bits were fed to me in mimicry. My wife's eyes danced as she said, "They offered me a ride." "Let's give old miss a ride in the barrer," she mimicked. "That's that John . . ." I said with assurance. "Recognise the voice?" "Mm—yes—*and* he has red hair, and all the red-haired ones fall for you, K." (My hair is red.)

The following evening as I go out, there, at the back door, is the same little gang sitting on *four* wheelbarrows. "Old miss comin' out woodin' to-night, sir?" The voice is hopeful. I look. It is a small boy with red hair!

(*b*) The summer sunshine streams through the open windows of the dining-hall. A little group of visitors sits at one end of the long hall, and the doorway at the far end frames a picture

of leafy trees and shady lawn. Sixteen senior girls filter in through a side door and move into formation for the country dance " Newcastle ". The girls are nearly all tall and well grown. They wear well-cut navy gym dresses, with short-sleeved cream blouses, white ankle socks, and rubber shoes. Navy ribbons on their trim heads secure their hair. We observe the poise of the girls, their sturdy brown limbs, their fresh clear skins and bright eyes, and they dance. They move easily and gracefully, and their faces are vivacious as, dancing opposite their partners, they flash little smiles. There is something elusive here, something of happiness, of gay spirit, of beauty. The dance changes to " The Dargason ". One of the visitors leans over and whispers, " Look at the way that girl [indicates] carries her head. Her movements are exquisite. She is very attractive." Gladys is acknowledged by the others to be the best dancer in the school. She loves dancing, and we believe that through it she has developed self-control and self-respect. In her spare time she sometimes coaches a team.

Gladys left school three months ago. She is a parlourmaid, and earns her own living. She writes us " newsy " letters and says she has joined a club for country dancing.

(*c*) Visitors have come this Friday afternoon to the kitchen to see the beginning of a cookery lesson. The girls were given their assignments last Tuesday so that they could think over and plan their work. They come now into the kitchen and each goes to cupboards and collects the utensils she needs. Along one side of the kitchen beneath three large windows is a built-in table-top 23 feet long on which are spaced three sets of scales and weights. Quantities of the raw materials that are in the greatest demand, like flour and sugar, are similarly spaced to afford ease of access. The girls take and weigh out or measure the materials they require. The teacher, who has been talking with the visitors, moves round the room observing, asking a quiet question here and there. The visitors watch Isobel, who has hair of real Titian hue under her pretty cap. She is making sausage rolls, and is busy with flaky pastry. She has a card of written instructions and diagrams. As she completes the rolling of the pastry, she pauses to study the card. Inquiry reveals that Isobel has made flaky pastry once before, a fortnight ago when she made jam tarts. There is Daphne, a

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quiet girl with a sense of humour. With the aid of a cookery book she is preparing a dinner for four people. She explains to us what she is doing, in a manner that assumes that we shall be as interested and thrilled with it all as she is.

The visitors question other girls, who are all working busily, then pass on to other classes, to return at the end of the session to the cookery class. The girls are now gathered round a large table on which repose the results of their efforts. The teacher is looking at each dish. " What happened to your rock cakes, Madge ? " We look. The rock cakes are not " nobbly ". Madge, one of the younger girls in the class, a fair-haired, blue-eyed, slender, good-looking child, answers with a little rueful smile, " I made 'em too wet, miss." " And your fruit-pie, Gwen ? " " I forgot the oven, miss." The pastry of the pie is burnt a little, and is probably hard, but the boys who ate it for tea pronounced it " Jolly good ".

Isobel left school nearly a year ago and is a housemaid at one of the College houses. Her home is a bad one, but her parents consented to her taking a job locally. She comes frequently to see us with attire and coiffure that are the envy and admiration of all the older girls. One of our small girls took my hand the other day and said, " Coo-oo, sir ! What do you fink ? Isobel has two baths every day. Ain't she clean ? "

Daphne, too, has left school—six months ago. She is a parlourmaid in a large house. She writes sometimes, but more frequently she avails herself of the permission she has to use the telephone. It is much more fun to ring up and gossip !

(*d*) And here is Mary, and we are sad because our efforts with her failed. She is a tall, slim girl with brown hair, fresh clear skin, and wide-apart blue eyes that sparkle with laughter ; a good-looking, lively girl. From being a very difficult small child—an imp of perversity—she grew up to be well-behaved. By the time she left school she could read the newspaper easily, her work in domestic subjects was good, and she was outstanding at gymnastics and dancing—a picture of grace. She grew to regard all the staff with affection, and we all liked Mary. After leaving school she worked in two situations for six months, with no great success. Then she came to see us and related to us with shame, and yet simply and honestly, a tale of human

frailty. Mary has been given further care and control. We had such hopes for her, and we failed miserably.

(*e*) And here is another with whom we failed, Joan, with her fair curly locks ; a really pretty girl—a trim, sturdy little figure who took the eye of visitors. Her attainments were exceptionally good. She reached a high standard in all her work. She won the Athletic Sports Championship and was outstanding at games. She was really a most likeable child, but her influence on other girls was detrimental, and she had to be discharged before she reached the age limit. Her mother insisted on having her home. The mother, having had a large family by a succession of " husbands ", and now getting on in years (Joan is the youngest), was by this time clinging fiercely to the skirts of respectability. Unfortunately she exercised no control over Joan, who in a year had four situations, with successively decreasing periods of tenure, and then—via a sergeants' mess, a series of gin-and-limes, and the road home, supported by two sergeants—arrived at the police court. Despite cries of " It's a shame " from the mother at the thought of separation, the magistrates decided that Joan needed a greater measure of care and control than the mother could give. But we failed. Our training must be lacking somewhere.

(*f*) Last week there was a letter from Archie, who is serving with H.M. Forces in Malta. It is a long, bright, interesting letter. He has won the battalion Sports Championship. He won the School Championship in his last year. He came to see us before going abroad—six feet of hard muscle, and a back like a board.

A letter from Nat in Iceland came some months ago, telling us about the " Northern Lights " and of his lessons in ski-ing.

Charlie, a majestic 6 feet 3 inches in the Grenadier Guards, was in the King's Company before the outbreak of war. When he visited us his magnificence was regarded with awe by small boys, one of whom asked in hushed tones, " Is that right, that Charlie guards the King and the Bank of England ? "

Another Charlie, who was doing very well in civil life, was called up. He came to see us, the proud possessor, in the R.A., of two stripes. We had heard from another source that he and one other, the remnant of an A.A. Lewis gun crew, had brought

down a very low-flying enemy 'plane. When he called, he did not mention it until we inquired.

Mabel who left school four years ago came to see us again recently. She is a Leading Aircraftwoman in the W.A.A.F., after having served for less than a year. Dorothy, who is now a telephonist in the A.T.S., came to see us when on leave, and paid a visit to the local dentist for two stoppings. She is so neat and trim, and stands and moves well. She talks well too.

(*g*) Bill drives a petrol lorry in a Supply Company of the R.A.S.C. He was on the beach at Dunkirk for two days, and came to see us when on his subsequent 48 hours' leave. He is a big, manly, modest fellow, with courage and humour. He was due to join his unit in the Midlands at 10 P.M. on the day he visited. "What happens if you're back late, Bill?" "Fellows back late get 28 days C.B., and 10 days' pay stopped; but it isn't that. It's not good enough to get back late, sir, because it stops some other chap from going on leave at the proper time." Bill, who was at Lankhills eight years, is the lad who, when he left the school, changed the circumstances of his family. When we visited the home a year after he left, the garden was filled with fine crops. The lad had papered two rooms and distempered another. The paint-work on the doors was finely finished. Bill's mother said, "We've had water laid on since you were here last," and showed us with pride a pump for the scullery copper. "You see, our Billy likes a bath every night when he comes in from work." Bill came in his summer holidays to see us each year after he left. The third year, he arrived on a new motor-cycle, bought outright with his own money. He showed us the bill, and his bank-book with a credit of £80. The fifth year after leaving, he drove up in a car, bringing a young man friend. His employer, a garage proprietor, had lent him the car for his fortnight's holiday. He, of course, had passed his driving test. He was proposing to take his mother, whom he regards with great affection, for some runs. Bill's mother writes occasionally. She has told us that Bill's father, who seldom worked before the lad went home, has worked regularly since shortly after that event. Whether this is due to force of example or not, we do not know. Bill is a very resolute character and a powerful young man, twice the size of his father.

(*h*) Nellie, a sprite aged 9, was with us for eighteen months. She has smooth red hair with a classical fringe, and eyes that seem to be green, and she is really much too bright for this school, but she had been a persistent thief at the day school and we agreed to give her a trial. She is cheerful, perky, and quick-tongued. After Nellie came, from time to time the other girls began to miss small articles of personal property. Each time Nellie stonily denied any knowledge of the matter. Then came the time when Nellie, a suspect, protesting her innocence, was given a Word Association Test. It indicated that she had *not* pilfered. "All right, Nellie," I said, "you didn't take it." I told her too that the words would tell us every time whether or not she had been stealing. On the next occasion the test indicated guilt, and Nellie, accused, for the first time admitted theft. It was noticed that she stole only pretty things, hair ribbons, coloured handkerchiefs, and that pink-coloured things appealed to her. She was given dolls, and scraps of dainty silks and ribbons with which to make clothes in her spare time. During the last twelve months she spent here she did not pilfer. One day in the school yard a conversation was overheard. A girl accused Nellie of taking an article that was missing. "Well, I didn't then, and Sir'll know I didn't, 'cos he's got *words*, and he always knows." On such slender threads hangs a reputation for omniscience !

Chapter III

THE BASES

A. THE MAIN BASIS OF SCHEMES AND METHODS

In chapters that follow education is dealt with subject by subject. In each chapter a Scheme of Work showing "content" is given together with some particulars of the teaching and learning techniques. In all the subjects the standards of attainment reached by the Lankhills children are stated, in as objective a manner as possible, because the justification (or condemnation) of methods depends ultimately on the results achieved by using them. Some readers will be able to make comparison with the achievements of children elsewhere of the same intellectual level. If some of the attainments that are described appear high, the phenomenon must be attributed to the techniques of teaching and learning that are used—and used under favourable conditions—and not to any personal merits of the team of teachers using them. In some chapters the evolution of the Scheme of Work is traced, in order to indicate a way to begin. The curriculum content and technique for these dullest of all children is regarded as *basic education*, as a foundation on which the superstructure for brighter children can be raised. In some subjects lines for the superstructure are suggested. In the chapter on Rural Science a full development is shown for three levels of intellect—for C, B, and A children. On the other hand in some chapters no superstructure at all is outlined, either because average children will probably rise little or no higher (for in certain practical work their abilities are no greater than those of dull children), or because the lines of the superstructure are already well known, as for example in an academic subject like English. One of our aims has been to set out schemes and methods in such detail that the non-specialist teacher of the subject can use them, and later develop them further. Another aim has been to provoke thought. For example some of our readers will be horrified at what they will consider heresies expressed in the chapter on Art. They

may be stimulated to set out their own creed and the reason for their beliefs. Others, who know little or nothing about the teaching of Art, may find a scheme of work which they can use easily.

None of the schemes and methods are the work of theorists, but of practical teachers. They have all been used successfully. They have been evolved over a period of years. One of the criticisms that may be made of the schemes and exercises is that they contain little that is new. A book on Education in which there was no regard to what had gone before, in which there was a failure to take cognisance of the existing body of knowledge, would have little value. In this book the general principle has been followed of planning a curriculum for dull children in which *practical work* predominates. This principle is certainly not new, for it has been applied in other schools for many years. There have, however, been several interpretations of the term practical work.

There was the line of thought that dull children could not use their brains very well but could work with their hands. This led to the introduction in some Special Schools of manual activities of manipulative type, often repetitive in process and occupational (*i.e.* to keep the child occupied) in type. Are such activities really educational?

The line of thought " These children cannot learn from books, so let them learn trades " was followed by the establishment in some special schools of workshops for the purpose of technical training. In these schools the children spend six sessions weekly in a workshop and four sessions in the classroom. Does experience and does the research of modern psychologists support a belief that feeble-minded children have the ability to learn these trades? Moreover the common need of children up to 16 years is surely for general education as opposed to vocational training.

A third line of thought was, " Dull children—ah !—*more* practical work ". As a result the dull children in some schools spend a great deal of time working in the practical rooms at Woodwork or at the Domestic Subjects. The work may be more educational and less in the nature of vocational training than in the second line of thought, but the tendency in this procedure is to narrow the curriculum. If for " *more* practical

work " the emphasis " *more practical* work " were substituted, *i.e.* work in all subjects made more practical, then a sound application of the principle would be possible.

The line of thought followed at Lankhills, that the practical work should stimulate intellectual activity, is not new either, for it is the thought underlying the work in many schools for normal children. Carrying this thought into action in such a way, however, that the classroom exercises are consciously planned to embody Spearman's principles of noëgenesis is, we believe, new.

In the methods described in the ensuing chapters, traces of the Project Method and of the Dalton Plan will be found. Something has been borrowed from both.

B. OTHER BASES

1. The Project Method

(*a*) The Project Method has had a lengthy vogue, more especially in the U.S.A. Many years ago it was in use in some of the American schools for normal children. In more recent years it has been proclaimed as the ideal method of education for dull children. In Miss Ingram's book, *Education of the Slow-Learning Child*,[1] particulars are given of one form of the Project Method used with dull children in the U.S.A. T. B. Hill's *The Education of Mentally Handicapped Children*[2] contains, in addition to a world-wide survey, an account of the method as used with dull children in Australia. In the Decroly[3] classes, projects are planned not only for children of below middle ability but for bright children too. The statement is made that the dull children in the Decroly classes who had failed to achieve much when work was presented by subjects, worked well when the presentation was in the form of projects. The method certainly warrants careful examination.

Readers will know that in the Project Method a " centre of interest " is chosen (Miss Ingram calls it a " unit of work ").

[1] *Education of the Slow-Learning Child*, by C. P. Ingram (Harrap).

[2] *The Education of Mentally Handicapped Children*, by T. B. Hill, edited by D. J. A. Verco (Melbourne University Press, in association with Oxford University Press).

[3] *The Decroly Class*, by Amélie Hamaïde (J. M. Dent).

The centre of interest might be : the Farm, Poultry, Cement, a Newspaper, the Survey of an Area of Land. Work on a particular project may cover a day, a week, a month, or three months. Exercises in several school subjects—in English, Number, Handwork, and perhaps in History and Geography—are planned by the teacher. The exercises all have a bearing on the chosen centre of interest.

(*b*) It is necessary here to introduce a personal note. My experience extends to using the Project Method with classes of children of four different and known mean intellectual levels, covering a wide range. One of our most successful projects with normal boys in an ordinary school (a project of a special type) was a survey of an area of moorland made by an older A class working in groups. Two groups working independently in opposite directions made a geographical survey—using prismatic compasses (which in use on smaller field and farm surveys they had learned to read accurately " on the swing "), chains, and poles. These groups drafted their bearings and measurements to make maps and then each group produced finally a tinted map on tracing cloth. Another group made a geological survey, and a fourth group a botanical survey. Books and maps were available for these last two groups, all the members of which produced a written study illustrated with sketches. The groups worked independently. Information acquired was pooled for the whole class. Some history of the area was studied. The project formed an interesting and valuable study lasting a week. Another week was spent on a Newspaper Project by a B group in an ordinary school. Exercises in English, Arithmetic, and Geography were based on the daily and weekly newspapers. A visit was paid to the offices of a newspaper, and production was observed. With feeble-minded children projects have been carried out which have taken part of the daily school time throughout a term. Weekly and daily projects, and projects covering a few lessons, have also been tried. In the chapter on Handwork (Paper and Cardboard Work) the form in which the Project Method has been ultimately adopted at Lankhills is shown.

(*c*) If we examine the Project Method carefully we shall see that such success as has attended its adoption is due not to superiority of *projects* as such over *subjects* as such, but to the fact

that the Project Method embodies certain features. We believe that these features can be embodied in a Subjects Method to obtain, not just as good, but better results. The Project Method makes an emotional appeal by stimulating the will to learn, because—

(i) the centre of interest is usually a situation or something in real life, of everyday and concrete type ;
(ii) self-activity on the part of the child is needed. Opportunities are given for a series of experiences that are brought into relationship with previous experiences.

(*d*) We maintain that education by subjects can embody these features. Readers will be able to judge for themselves by reading the chapters which follow. In the past, in weighing Project against Subject the error that was made was in thinking of Subject as " formal teaching of subject " instead of in terms of activities and experiences of children.

(*e*) The Project Method has two weaknesses which do not exist in the Subjects Method :

(i) It offers great difficulties in the planning of exercises that will enable all the children in a class to work at their highest possible intellectual levels. Much of the work is apt to be repetitive and much may be merely of manipulative type calling for little or no intellectual effort. If the exercises for children are planned to suit their abilities, they have often an artificial and unreal connection with the project. Projects thus tend to impose limitations.
(ii) Education in the form of a series of Projects tends to lack continuity. There is for the child no steady progress.

(*f*) It is no part of the purpose of this book to belittle any methods that others have tried and found useful. We, as teachers, need to examine methods critically, to give them fair trial, to discard those features that do not serve our purpose, and to retain and embody in our work those features that do. We must, too, be honest with ourselves and not decry new methods because of our own lethargy and our liking for ruts and grooves ; nor should we disparage methods when our failure with them may be due to our own special personal limitations. Most new methods introduced in recent years

contain some principles or features that we can adapt and adopt in our own practice.

The Spens Report [1] says of the Project Method :

> The " project method " in the full sense of the term has a very useful place in the teaching of young children. We recognise, moreover, the great value of occasions (the production of a school play or the building of a cricket pavilion are obvious instances) which invite the application and synthesis of a considerable range of acquired knowledge and skill. But our general doctrine forbids us to go much farther than this ; for its essence is that the school " subjects " stand for traditions of practical, aesthetic, and intellectual activity, each having its own distinctive individuality ; and we hold that the profit a pupil derives from them does not come from casual or episodical contacts, but by his being, so to speak, put to school to them, and so getting to make their outstanding characters part of the equipment and habit of his mind. If this is to happen, the subjects must be pursued as such—though we have urged that they should be pursued actively and not merely be assimilated by memory and understanding.

2. The Dalton Plan

(*a*) All teachers are so familiar with the details of the Dalton Plan that it is not proposed to give them here. It is sufficient to remember that Miss Parkhurst in her wisdom and tolerance showed us a plan which was not rigid but flexible, a plan that need not be adopted in its entirety but from which some of the principles can be taken.

(*b*) Again a personal note is necessary, because this book is an account of actual experiences. I have tried the Dalton Plan in its complete form in an ordinary school. After trial over a period, the laboratory system (of specialist rooms and teachers) was abandoned because the school was too small. It was found also that too great a proportion of the children were of too low a mental age (either too young or too dull) to work within the plan. It will be remembered that the plan was evolved for normal children of 12 + years, *i.e.* with a mental age of 12+. Assignments of work to last a month (in the original plan) were found too big and overpowering. Eventually the top A class only was given weekly assignments of work. The principle of individual self-activity in the Dalton Plan was thus taken and used. Successive top A classes worked on these

[1] *Secondary Education*, Report of the Consultative Committee, 1938 (H.M. Stationery Office).

lines successfully for the remaining six years we spent with them. An example of an assignment of work is given in this book at the end of the chapter on Rural Science. Some of our readers will have had different experiences and may be using some other adaptations of the Dalton Plan.

(*c*) The traces of the Dalton Plan that have been retained for the education of the children at Lankhills appear to have little connection with the original Dalton Plan. They are, however, present. The principle of individual self-activity put into practice by the presentation of situations in which problems must be solved independently was borrowed from the Dalton Plan, and is an essential thread woven in the methods that are used. Cards prepared by the teacher are used by the children in their work in Handwork, Needlework, and Domestic Subjects. These cards are really assignments of work—sometimes covering one lesson period, sometimes more. The English and Arithmetic cards too are forms of assignments.

Chapter IV

TESTS OF INTELLIGENCE, ATTAINMENTS, AND APTITUDES

Readers of this book may be busy teachers seeking definite material for immediate use in their work with children. Such readers will omit Chapters IV and V and pass on to Chapter VI. Our experience is, however, that most teachers are deeply interested in tests of various kinds, that many make use of them, and that many want to know more about them. If therefore you can return to this subject later you will find in it not just a survey of intelligence tests, but a consideration of tests from the teacher's viewpoint. The chapter contains, too, an account of investigations into the abilities of a group of the dullest of all children, and records some interesting and unexpected results.

A. VERBAL TESTS

1. Introductory

(*a*) The Press and B.B.C. broadcasts have made the general public familiar with and interested in tests of intelligence. Our own level of intelligence and the levels of members of our own families are of personal interest to each one of us. We become interested, too, in the intellectual level of our friends and acquaintances. Our assessment of these levels by means of tests may possibly test also our own intelligence, wisdom, and tact. The subject of tests of intelligence has been dealt with in other books. It is not proposed here to touch on ground that has already been fully covered, but rather to indicate sources of information. In *Mental Deficiency* [1] there is a brief survey of the development both of individual and of group tests of intelligence, a statement of the principles upon which tests are based, and some examples of test questions. *The Nation's Intelligence* [2] sets out the methods of constructing an

[1] *Mental Deficiency*, by J. Duncan (Watts).
[2] *The Nation's Intelligence*, by J. L. Gray (Watts).

intelligence test, the results obtained from applying a test, and some interpretation of the results. Both of these books are inexpensive. *A Guide to Mental Testing* [1] is a comprehensive catalogue of tests of intelligence, of aptitudes, and of emotional factors, with the names of their compilers and publishers. Burt's *Mental and Scholastic Tests* [2] is widely known. *The Fight for Our National Intelligence* [3] gives the results of surveys of intellectual levels in both an urban area and a rural area, and presents cogent arguments in support of a statement that our national intelligence is declining.

(*b*) Generally, teachers in Senior and Junior Schools will find not a great deal of use for the individual test of intelligence. Such a test is useful chiefly for investigating the mentality of an abnormal child. Teachers are concerned primarily with groups of children, with grading according to ability a large number of children, usually of a single age group, for the purpose of classification. For this purpose a well-chosen group test is suitable.

2. Two Types of Verbal Group Tests of Intelligence

Group tests fall into two general types, based on two different theories :

(*a*) A mixed type of test, based on the " anarchic view " that " the mind comprises a large number of special abilities and that general intelligence is at best merely a sampling of these specific abilities ".[4] The first intelligence scale evolved, the individual test of Binet and Simon [5] (revisions by Terman,[6] by Burt,[7] and by Terman and Merrill [8] are used to-day), was based on this view. A group test that is an excellent example of this mixed type of test is *The Simplex Junior Intelligence Scale*.[9]

(*b*) A factor type of test, based on the " monarchic view ",

[1] *A Guide to Mental Testing*, by R. B. Cattell (University of London Press).
[2] *Mental and Scholastic Tests*, by C. Burt (P. S. King).
[3] *The Fight for Our National Intelligence*, by R. B. Cattell (P. S. King).
[4] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).
[5] *Mentally Defective Children*, by Binet and Simon, trans. by W. B. Drummond (Edward Arnold).
[6] *The Measurement of Intelligence*, by Lewis M. Terman (Harrap).
[7] *Mental and Scholastic Tests*, by C. Burt (P. S. King).
[8] *Measuring Intelligence*, by Terman and Merrill (Harrap).
[9] *The Simplex Junior Intelligence Scale*, by C. A. Richardson (Harrap).

on the theory that " there is a general factor in the mind which plays an overriding part in human thought, a general factor which is always present in greater or less degree. It is a belief that there is a single factor which varies in amount from individual to individual, the amount a person has determining his skill in the ordinary thinking processes." [1] These tests attempt to measure this general factor. It is the factor g determined by Spearman,[2] and it is assumed to be the ability to educe new relationships and correlates. Tests of this type are composed of problems which exercise this ability, and in a typical test there are a large number of questions under each of the following heads :

(i) finding words with the same meanings,
(ii) classification of words,
(iii) finding words of opposite meanings,
(iv) analogies,
(v) completion—filling word gaps in sentences with a selected word,
(vi) inferences.

It has already been stated that in these tests the attempt is made to measure the general factor g. It is not, however, possible to measure g alone. The general factor operates in conjunction with a special factor or factors. If an intelligence test is a verbal one it measures not only general ability but a special ability as well—verbal ability (v). The aim of the psychologists compiling intelligence tests is to evolve a scale that will measure as much g and as little v as possible. They seek to produce tests that have, in their words, " as high a saturation of g as possible ". Cattell [3] does this in an excellent series of scales (*a*) by making four scales, each suitable for a limited age span, (*b*) by constructing the more difficult examples, not by invoking less familiar words but by demanding nicer distinctions between words already known, and (*c*) by using diagrams instead of words for the most difficult problems at the end of each test.

[1] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).

[2] *The Abilities of Man*, by C. Spearman ; or for a condensed account, *Ability and Knowledge*, by F. C. Thomas (both Macmillan).

[3] *Cattell Intelligence Tests*, Scales O, I, II, III (Harrap).

3. Two Types of Tests Compared

You will wonder, of course, which of these two types of tests is the better. In actual practice a well-planned mixed test will give placings that correlate very closely with the placings given by a factor-theory test. Most mixed tests contain some questions like those in the factor-theory type—questions of what we may call gv type that are tests of ability to educe word-relations. They usually contain also some questions in simple mechanical and problem Arithmetic and in English, the solutions to which are dependent in some degree on the level of educational attainments. But the level of attainments generally marches closely with level of ability, so that the mixed test as a whole tends to be a fair measurement of ability. Testing for the purpose of classifying entrants to a Senior School offers special problems which will be considered later in this chapter. In view of differences in teaching in the several Junior Schools tributary to a Senior School, and of the differences in attainments that may be due to this, it appears reasonable to assume that a factor-theory test would, for this classification, give a more satisfactory grading by ability than would a test of mixed type. The increasing proportion of factor-theory tests published, and the increasing use in the mixed tests of questions involving relationships and correlates, are indicative of a general trend.

4. Ranges of Intelligence Levels in Classes

A question that has been asked by teachers in Senior Schools is : "What range of intelligence (I.Q.) should each of the A, B, and C classes contain ?" The answer is that it is not possible to state absolute levels, for two reasons : (*a*) the whole range of I.Q. differs between one Senior School and another, and (*b*) different tests will give different I.Q.s, although the placings may be generally similar.

With regard to (*a*) : in a Senior School drawing children from Junior Schools in a large town with skilled industries, one would expect to find a mean and range of intelligence higher in each class than in a Senior School drawing on rural areas. Classification is not absolute but relative, relative to the entrants and to the accommodation. The differences that exist in

different schools, of mean intellectual level and of range of intellect, constitute one of the arguments in favour of freedom for the teacher—of freedom to formulate curriculum and to plan technique. This freedom exists in this country, but does not exist yet in any of the Dominions.

5. Tests for Classification in Senior Schools

Difficulties in classification are :

(*a*) If classification is made by ability, remedial teaching may be needed by some children in order that their attainments may match their abilities.

(*b*) If classification is to be by ability, which ability is to be the criterion for grading ? In Senior School curricula there are academic subjects, success in which depends largely upon gv ability, and there are practical activities of many kinds, in which success is largely determined by gF ability (these abilities are explained later in this chapter). Moreover in schools generally, approach to the academic subjects is increasingly being made by the presentation of concrete and visual situations (gF situations). Is a gv or a gF classification to be used? Dr. Alexander [1] suggests a compromise. Our experience, both with four levels of grading of elder children covering the whole range of intellect, and with two levels of grading of elder feeble-minded children (who fall within a narrow span of gv ability), is that a gv grading makes for easier working. It is, too, easier and quicker to carry out, although of course this should not weigh against efficiency. In a Special School for feeble-minded children, with its narrow range of gv ability, and in particular with its activities largely on concrete and visual lines (gF type of work), one would expect that a gF classification would be more successful. We have found in practice, however, that a gv classification is preferable.

Some of the practical subjects are in the nature of group activities, *e.g.* Country Dancing, Physical Education. In the teaching processes both visual demonstration and words are used. With the lower gv level of children, methods are less verbal and more visual. Some practical subjects, *e.g.* Cookery

[1] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).

and Handwork, are on individual lines at this school, but words are used in the learning processes. Assignments of work for the higher gv group are written or printed. Arithmetic in the form of weighing and measuring is also applied in these subjects. A gv classification enables full use to be made of skills acquired in the academic subjects. For practical subjects as well as for academic subjects, a homogeneous gv class appears desirable. The gF grading for work in most of the practical subjects is quite easily made internally, within each class, because work in these subjects generally is on individual or small group lines.

(*c*) Even if we agree that classification should be by gv ability there remains the problem of how it is to be achieved. The very great majority of children entering a Senior School have I.Q.s within the range 70 to 120. Children generally of I.Q. above 120 have been creamed for the Secondary Schools. In the Senior School this I.Q. range at the age of $11\frac{1}{2}$ years gives a range of mental age of from about 8 years to 14 years, a span of 6 years. The difficulty is to find single tests that will measure with any degree of accuracy the abilities of children of such a wide range of mental age. Tests difficult enough to spread children with mental ages of from say 11+ to 14 years are too difficult verbally for all children with mental ages of from 8 to 10, and so will fail to discriminate between them and spread them. The solution appears to lie in the application of two scales, one to the whole group and one to part of the group. Cattell's Scale II [1] is designed to measure accurately mental ages of from 11 to 15 years, and in fact appears to give reasonable accuracy over a little greater mental-age span. If applied to all entrants to a Senior School the results would enable selection to be made of A and B children in a four-stream school, or of A and about half of B children in a three-stream school (*i.e.* grading the intellectually better half of the children). The lower half of the children could then be tested with Cattell's Scale I (range of mental age 8 to 11 years). The Scale I is a group test too, but of non-verbal type. It is reputed to have, in common with these verbal scales, a high saturation of g.

[1] *Cattell Intelligence Tests*, Scales O, I, II, III (Harrap).

6. Tests for Special Place Examinations

Group Tests of Intelligence are used in Special Place Examinations. It is known that the ability to profit from an academic type of education in which the medium is words, is dependent not only upon high general ability (g) but also on high verbal ability (v). A good example of this type of test is the Thanet Aptitude Test [1] which has a saturation of g and v in the ratio 50 : 50. It is called an aptitude test rather than an intelligence test because intelligence is regarded as g (although of course it operates always in conjunction with a special factor or factors), whereas this test is one of aptitude to receive an education of academic type. Published in series with this Aptitude Test are simple tests of *basic* English and of *basic* Arithmetic. These are in the nature of very easy minimum attainments tests, applied for the purpose of eliminating those candidates who lack the bare essential groundwork. The remainder, irrespective of attainments, are then graded according to the results of the Aptitude Test.

Among the best known tests used for the selection of children for the award of Special Places are the excellent Moray House Tests.[2] There are several series. The complete examination papers consist of (*a*) a Group Test of Intelligence, (*b*) an English Test, and (*c*) an Arithmetic Test. In both the Moray House Tests and the Thanet Tests the English and Arithmetic papers contain a large number of questions of objective type, *i.e.* requiring an answer either correct or incorrect, with a value independent of the marker's opinion.

We would stress the point that tests planned for the particular purpose of assisting the selection of children for Special Places are generally not suitable for classifying children in Senior Schools. They are too difficult for children of middle gv ability and below. More suitable for the purpose of classification of children in Senior Schools are tests with a high g saturation, dependent for solution more on general ability and less on verbal ability than those mentioned in this paragraph.

[1] *The Thanet Aptitude Test*, by W. P. Alexander (University of London Press).
[2] *The Moray House Tests*, by G. H. Thomson and colleagues (University of London Press).

7. Saturation of g ; Constant or Variable ?

Many tests are published with a statement of their g saturation. For example, it may be asserted that a particular test has a g saturation of 0·6 (and therefore 0·4 of v or other special factors). A point that we have never seen raised, but which may be of interest to teachers, is that pairs of children obtaining the same score appear to have different amounts of g and v. One child appears to have more g and less v than another. Our reasons for thinking that this is so are :

(a) *Observation.*—Among even these dullest of children are some of verbal type. They appear to have relatively high verbal ability ; they reach a high mechanical reading age but they are quite unable to plan simple jobs of work or to apply what they read. Others of the same gv level reach a lower mechanical reading age ; they are able to plan quite well and they can apply even the little they read. (Note affecting objectivity of this observation : At this school reading is taught individually ; special cases are investigated ; standardised tests are used.)

(b) *Testing with Performance Tests of Intelligence.*[1]—These are reputed to measure g + F. Children of the same gv level show gF differences that are very great.

(c) *The Application of Raven's Tests.*[2]—These, which are stated by Spearman to have a very high g saturation upwards of 0·8—and are of non-verbal type, reveal very wide differences indeed between children of the same gv level.

All teachers have encountered children of the verbal type, children who have fairly good verbal attainments but seem lacking in the ability to apply, to plan, to compare and contrast —really in the ability to deal with relationships. They appear to have a high v and little g. The ratio of g and v may be constant for the test itself but it appears to be variable as between child and child. Thus in the case of two children of the same I.Q. one child appears to have much g and little v, and the other little g and much v. If this is so, the I.Q. of any

[1] Alexander's Battery of Tests : (a) *Kohs' Block Design Test* (Baird) ; (b) *Alexander's Passalong Test* (Nat. Institute of Industrial Psychology) ; (c) *Cube Construction Test* (Nat. Institute of Industrial Psychology) ; Alexander's Monograph—*Intelligence, Concrete and Abstract*, by W. P. Alexander (Cambridge).

[2] *Progressive Matrices*, by J. C. Raven (H. K. Lewis).

particular child represents the sum of two factors the ratio of which is unknown for that child. The picture given by an I.Q. is thus rather hazy. A test is not like a footrule with one constant of measurement, the inch, but is a means of measurement by which we get a figure that while definite itself represents the sum of two factors in unknown amounts. What concerns us as teachers is the usefulness of test results. We can say that an I.Q. given by a verbal type of intelligence test indicates generally the degree of ability to deal with verbal and abstract situations, and to benefit from an education in which the medium is largely verbal.

B. NON-VERBAL TESTS

1. Classification

We can divide these roughly into two main groups :

(a) *Visual Tests*—usually in the form of diagrams. Most of these seek to measure g by presenting problems in visual relationships. Examples of this type are the Otis Tests [1] which can be used either as a group test or as an individual test, Cattell's Scale O [2] which is an individual test, and Raven's Progressive Matrices which is an individual test of which further details are given later in this chapter.

(b) *Performance Tests*, in which the medium is not only visual but is also concrete—seen and handled. The term Performance Tests is vague. Under such a head would come Performance Tests of Intelligence of the type collected by Frances Gaw.[3] These include the Cube Imitation (tapping in series), Healy's Picture Completion, Goddard's Formboard, and other tests, making a total of fourteen for each of which (but not for the group as a whole) there are norms. An account of the application of four of these tests is given later. Gaw's group includes the Porteus Maze Test which is a visual test just as much as the Otis Tests and Cattell's Scale O—so that the distinction between "visual" and "performance" is not very clear.

[1] *Otis Intelligence Tests*, by A. S. Otis (Harrap).
[2] *Cattell Intelligence Tests*, Scales O, I, II, III (Harrap).
[3] *Performance Tests of Intelligence*, by Frances Gaw, Industrial Fatigue Research Board, 1925.

Each of the tests collected by Gaw seeks to measure intelligence, presumably g, but the tests measure also special factors that are not defined. Our experience of these tests leads to a view that there is a considerable element of chance in the solution of some of them. Alexander's tests of Concrete Intelligence measure the defined factors g + F, which sum is assumed to be the ability to educe relationships and correlates in concrete situations. This appears to be the ability used, in greater or in less degree, in doing ordinary everyday jobs of work. An account of an investigation carried out with Alexander's Tests is given later in this chapter.

Included in Performance Tests would be the tests devised by the National Institute of Industrial Psychology for the purposes of vocational guidance and vocational selection, for engineers, weavers, telephone operators, etc. Certain Aptitude Tests, too, are performance tests, *e.g.* Cox's Tests of Mechanical Aptitude.[1] Cox's tests measure g + m in the ratio of 0·6 to 0·4 respectively.

A battery of tests devised by the National Institute of Industrial Psychology for the purpose of measuring Manual Dexterity[2] is of interest in that it appears to measure less g than any other test we know. We have stated that g operates in all activity. These tests are, however, specially designed for the purpose of measuring movement, control of fingers, hands, and arms, speed and co-ordination, and tactual perception. The relationships to be grasped in carrying out these movements are so simple that these Performance Tests appear to measure the special ability in high degree.

2. Investigation with Performance Tests of Intelligence

An investigation which has a bearing on the education of intellectually dull children, and possibly on that of normal children too, has been made at Lankhills.

Some years ago it was observed that some defective children after leaving school became self-supporting. Others, of the same I.Q., of equally stable temperament, with homes and

[1] *Mechanical Aptitude*, by J. W. Cox, obtainable through the Nat. Institute of Industrial Psychology.

[2] Manual Dexterity Tests, devised by the Nat. Institute of Industrial Psychology.

opportunities equally good, were unemployable. Examination of records kept over years revealed that while these children who were later unemployable learned to read and did relatively well at some " school " subjects, they were, throughout their school career, inept at doing practical jobs of work.

(*a*) It was thought at first that failure might be due to lack of manual dexterity. Application of a battery of tests of manual dexterity, devised at our request by the National Institute of Industrial Psychology, revealed that while all those who were good at jobs had reasonably good manual dexterity, some of those who were inept at jobs also had good manual dexterity. The determinant was thus not manual dexterity.

(*b*) Close observation was then made of the inept, and efforts were made to analyse work processes, and to see what mental and physical factors were necessary to carry out simple jobs of work.

It was concluded that when so-called " intelligence " and emotional factors were eliminated, there still remained a variable which we called power of performance, and which we thought was the ability to plan and work in right sequences. Even a simple job like scrubbing a floor consists of a series of operations in a certain order. Attempts were made to measure this power of performance. During the winter of 1934–5 every boy and girl in the school was tested with a battery of Performance Tests of Intelligence. These tests were the Cube Imitation Test (tapping in series), Porteus Maze Tests, Healy's Construction Test A, and the Diagonal Construction Test.

There were no norms for the battery as a whole, but norms for each of the tests had been found by psychologists. It was observed that—

(i) those very few children who did well in all four tests were those known to be good at jobs of work,
(ii) those very few children who did badly in all four tests were those known to be inept at jobs of work,
(iii) the great majority of children did well in two tests and badly in two tests (there was no uniformity as to the two tests),
(iv) examination of the results showed no significant correlation in the placings by any two of the tests. The conclusion drawn from this was that either the tests did not

measure the same factors, or there was a considerable element of chance solution. Observation during testing supports the latter conclusion.

(*c*) In May 1935 Dr. W. P. Alexander published a monograph on Concrete Intelligence.[1] What he called concrete intelligence appeared to be identical with what we had called power of performance. Dr. Alexander defined concrete intelligence as " the power to deal intelligently with things ". There is, of course, only one intelligence—g. It may operate in conjunction with v in dealing with words or abstractions, or in conjunction with another special factor, for example F in dealing with things. The situation is very often, if not always, not just a two-factor situation, but rather a multiple factor situation, involving perhaps three or more factors. The work of Professor Thurstone in Chicago, amongst others, has made it possible to deal with such a situation.

Dr. Alexander, adopting the method of Thurstone with modifications introduced by himself, isolated the special factor F. Concrete intelligence is expressed by the sum of g + F. To measure Concrete Intelligence, Alexander used a battery of three performance tests consisting of (*a*) the Cube Construction Test, (*b*) Alexander's Passalong Test, and (*c*) Kohs' Block Design Test. The following are features of these tests :

(i) Each test consists of several sub-tests, and the solution of each sub-test entails a large number of planned moves. The element of chance which caused the failure of our first attempt was thus eliminated.

(ii) Each test does in fact measure the same two factors g and F in different amounts.

(iii) A method of fine measurement has been evolved, and norms for the battery as a whole have been established. The total scores can readily be translated into terms of Concrete Mental Age correct to a month, and so into what can be called Practical Quotient (P.Q.).

(*d*) All the children in the school have been tested with Alexander's battery of Performance Tests.

[1] *Intelligence, Concrete and Abstract*, by W. P. Alexander (Cambridge University Press).

(i) Before the testing was carried out, the staff were asked to make class lists of the children, placing them in order according to their practical ability (capacity to do jobs entailing some planning and a series of operations). These lists were based on careful observation over a period. The placings by Alexander's battery correlated very closely with the list placings, and in some cases there was complete agreement.
This is of importance in this way. It appears to be possible to make prognosis of a defective child's career by means of tests (which take only an hour or one and a half hours to apply), without some months of observation.

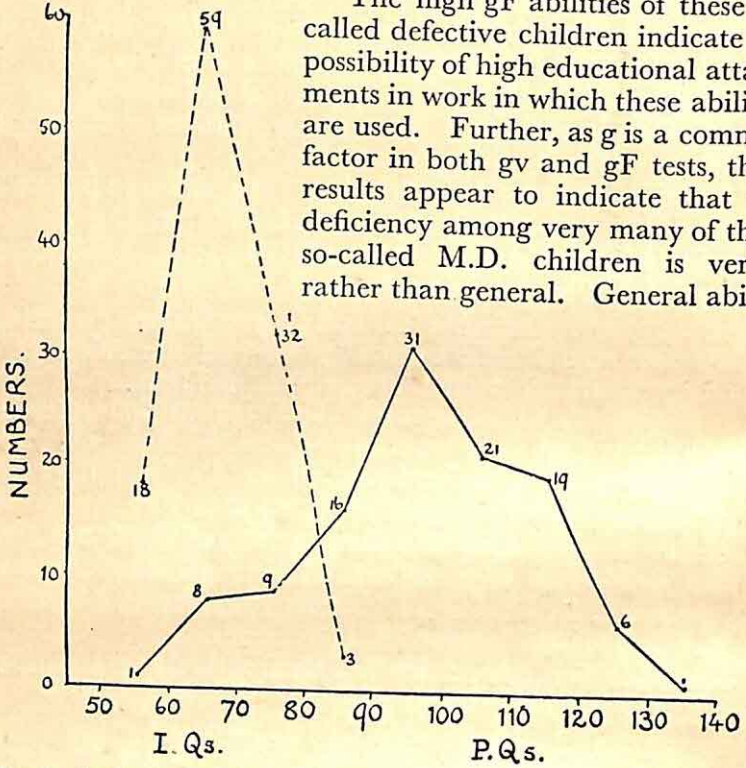
(ii) It appeared desirable to find the relationship existing between the Concrete Intelligence and the Abstract Intelligence in this particular group of children.
The Abstract I.Q.s (Stanford Binet) of all the children in the school had been ascertained before admission. Some of this testing had been carried out in difficult circumstances, and where any doubt was expressed by any member of the teaching staff as to the accuracy of the figure given, the child was re-examined. Thirty children were re-tested, and the final list of Abstract I.Q.s from which results were calculated is regarded as accurate.
The following are results obtained with the group of 106 children originally tested :

The range of I.Q. (Stanford Revision) for the group, omitting the four highest and four lowest (exceptional) cases, was 52–75, with a mean I.Q. of 66.
The range of P.Q. (Practical Quotient—Alexander's Performance Tests), again omitting the four highest and four lowest cases, was 63–117, with a mean P.Q. of 91.

All entrants to the school are now measured with Alexander's Performance Tests, and their Concrete P.Q.s are ascertained as a matter of routine. The present ranges and means (1941) of all the children in the school—practically all new admissions since the original investigation—are :

Stanford Revision—Range of I.Q. 54–76, Mean I.Q. 66.
Alexander's Tests—Range of P.Q. 67–119, Mean P.Q. 96.

The Coefficient of Correlation between the two tests was found to be 0·54 with a probable error of ±0·050.



Distribution by Stanford Binet Test (– – –) and by Alexander's Performance Tests (——) of a group of 112 Feeble-Minded Children.

The high gF abilities of these so-called defective children indicate the possibility of high educational attainments in work in which these abilities are used. Further, as g is a common factor in both gv and gF tests, these results appear to indicate that the deficiency among very many of these so-called M.D. children is verbal rather than general. General ability may be inferior. Verbal ability is obviously very inferior indeed. The investigation with Raven's Tests too appears to support this view.

3. Investigation with Raven's Progressive Matrices[1]

(*a*) Each test consists of a design or matrix from which a part has been removed. The tests are planned to measure accuracy of eduction. In one of the more difficult tests, for example (D. 12), solution depends on the eduction of three

[1] *Progressive Matrices*, by J. C. Raven (H. K. Lewis).

relationships that exist between each of two series of lines and figures and the application of these relationships to a third incomplete series in order to select from eight isolated figures the one that will complete the series. Solution is not in any way dependent on verbal ability, and the tests can be applied to deaf mutes. Raven gives an easily understood account of his work in *Mental Health*.[1] Spearman states that the tests have an exceptionally high saturation of g (upwards of 0·8, and so less than 0·2 of special factor). Norms for these tests are in the form of percentile ratings. That is to say one child in twenty (5% of children) may be expected to obtain a score at or above the level of the 95 percentile points, and one child in twenty (5%) may be expected to obtain a score at or below the level of the 5 percentile points. Similarly one child in ten (10%) may be expected to obtain a score at or above the 90 percentile points, and one child in four (25%) to obtain a score at or above the 75 percentile points. One child out of every two (50%) may be expected to obtain a score which lies between the 25 and 75 percentile points (inclusive).

(*b*) Raven's tests were applied to 91 Lankhills children. The 10 youngest were not tested.

(i) Range for the 91 children was from below percentile point 5 to percentile point 84.
(ii) Range, omitting 4 highest and 4 lowest, was from below percentile point 5 to percentile point 65.
(iii) The mean percentile was 25.

Practically all these children fall within the poorest 3% or so of the general child population when measured with Stanford Binet Tests. From this it would appear that if the Stanford Binet results were expressed as percentile ratings they would certainly, with perhaps two exceptions, show all these children below the level of 5 percentile points. The fact that in Raven's Tests 54 children out of the 91 are above 10 percentile points appears to have a special significance. The Stanford Binet Tests are chiefly verbal, and appear to measure chiefly g + v. The Raven Tests measure chiefly g. The contrast in results from the two tests appears to support a view that the inferiority of this group of F.M. children, compared with children of

[1] *Mental Health*, January 1940 (Central Association for Mental Welfare).

middle gv ability, is much more a verbal than a general inferiority.

The cumulative distribution by Raven's Tests was :

1	child	out of 91		above	80	percentile points	
2	children	,,	,,	,,	70	,,	,,
6	,,	,,	,,	,,	60	,,	,,
15	,,	,,	,,	,,	50	,,	,,
26	,,	,,	,,	,,	40	,,	,,
32	,,	,,	,,	,,	30	,,	,,
45	,,	,,	,,	,,	20	,,	,,
54	,,	,,	,,	,,	10	,,	,,
59	,,	,,	,,	,,	5	,,	,,
32	,,	,,	,,	at or below	5	,,	,,

Raven states that his norms for children above 14 years of age are less reliable than the others. Our results appear to support this statement.

Mean percentile points (children above 14 years), 27.
,, ,, ,, (,, below ,,), 22.

Further, 13 children out of the 54 who are 14 years of age and over reached percentile ratings of over 50. Only 2 children out of the 37 under 14 years of age reached this level. In view of this, caution must be exercised in making deductions. The results appear without doubt, however, to support a view that the v inferiority of the children in this group is relatively very much greater than their g inferiority.

The results from both Alexander's and Raven's tests appear to us a message of hope for all who have the privilege of teaching dull children. The abilities of these children are far higher than many of us have suspected. That their attainments have been low is due to an educational approach through the medium of words, their weakest factor. If the abilities of duller children are to be matched by their attainments, we must set their feet on the gF pathway.

C. ATTAINMENTS TESTS

1.

Reference has already been made to tests of attainments used for the purpose of the Special Place Examination. Many

standardised tests of attainment have been published. They cover many subjects, but in more general use are those in Arithmetic and English. Tests of this type having been tried out on very large unselected samples of children enable one to compare the attainments of children not just with those of other children in one particular school but with children generally. Any child of 12 years, for example, can be compared with the average child of 12 years. This comparison is made sometimes by the method of comparing the raw scores obtained in a test, but more usually in terms of an " attainment age ", *e.g.* Arithmetic Age, or Reading Age. Attainments Ages can be translated into attainments quotients and compared with I.Q. For example a child with an I.Q. of 120 may have a Reading Quotient of only 100. He is definitely retarded in Reading.

2.

Not only is it possible by using these tests to compare the attainments levels of children with those of average children, but by comparing year by year results it is possible to measure progress. Generally a child 12 years old, if he is of middle gv ability (in this case mental age 12 years), will have an Arithmetic Age of 12 years and a Reading Age of 12 years. At least this will be so if his attainments match his ability—and that is what we as teachers want. A year later, if he has maintained progress, he will have attained an Arithmetic Age and a Reading Age of 13. A child of 12 years with a mental age of only 9 years could be expected to have an Arithmetic Age and Reading Age of 9. For his attainments to continue to match his abilities he will make in a year only 0·75 of a year progress in these subjects in one year. In cases where attainments ages lag behind mental ages, greatly accelerated progress is possible.

3.

An essential feature of standardised tests of attainments is that they are *objective*. They consist usually of a large number of short problems, the answers to which are obviously either correct or incorrect, and are independent of the marker's opinion.

4. Some Attainments Tests

(*a*) The best known tests of this type are Burt's Scholastic Tests. Burt's book [1] contains tests of educational attainments in Reading (both Mechanical and Comprehension), Spelling, Arithmetic, Writing, Drawing, Handwork, and Composition. Two of his tests, the Reading (Accuracy) Graded Vocabulary Test, which is a test of mechanical reading, and his Arithmetic (Graded Oral Test : Mental) have been used at Lankhills for many years. Ballard's Attainments Tests [2] too need no comment.

The Watts Metropolitan Junior School Reading Test [3] and Oral Arithmetic Test are carefully graduated and are useful in both Junior and Senior Schools. This reading test in its published form is an individual test of mechanical reading. In the form of a Group Test of Reading for Comprehension it has been used at Lankhills for some years, and has given interesting and useful results. In this form it is published in this book as an Appendix, by the kind permission of Mr. Watts. With the Watts Oral Arithmetic Test are given norms for Juniors to 11·5 years and norms for seniors with 20% creamed.

(*b*) By means of group tests the measurement both of attainments and of intelligence (gv) can be carried out with any class quickly. Comparison between ability and attainments is a step towards the goal of " matching ". The next step appears to be investigation of those cases in which attainments do not match ability. Of all the subjects Arithmetic appears to us to be the one that reveals the greatest range of attainments at any given level of ability ; in which there is the least " matching ". One cause of retardation in Arithmetic is the failure of a child to acquire some one essential item of skill. Of great assistance in analysing the exact nature of progress made by pupils, and so of finding any essential skill that may be lacking, are Schonell's Diagnostic Tests.[4] These of course are a special kind of test of attainment.

[1] *Mental and Scholastic Tests*, by C. Burt (P. S. King).
[2] *The New Examiner*, by P. B. Ballard (University of London Press).
[3] *Research in Education*, by A. F. Watts (the Third Tibbey Memorial Lecture, Nat. Assoc. of Head Teachers).
[4] *Diagnosis of Individual Difficulties in Arithmetic*, by F. J. Schonell (Oliver & Boyd).

D. THE TEACHERS' SAFEGUARD

Inspectors, some psychologists, and our skilled professional colleagues may be capable of judging the value of a technique of teaching and of a technique used by a child in learning. The preparation of a lesson, the emotional environment, the content and scope, and the techniques may be open to criticism. Nobody, however, is capable of judging a teacher's work by the attainments of children in academic subjects unless he knows too the children's gv ability. From time to time we are told by visiting teachers that their work has been severely criticised by inspectors because of the poor attainments in English or Arithmetic of certain children in their classes, and that the teachers' view is that these children are not able to do any better. We have never experienced personally this kind of criticism nor indeed anything from inspectors but the kindliest interest, encouragement, and help. If, however, this kind of criticism should be made, a teacher can have in his own hands the means of defence. No inspector can or does expect high academic attainments from children of low gv ability. If a teacher has made objective measurements both of the ability and of the attainments of children, then he is in a position not only to face outside criticism, but more important still, to examine his own work critically.

General criticism that may be justified is that for children of lower gv ability the exercises are frequently too verbal and abstract in type and at too high an intellectual level for the child. We have seen instances where this has been appreciated by the teacher of a special class, and where she has gone to the other extreme and introduced work that is largely occupational rather than educational, work of a repetitive, manipulative manual type which does not stimulate any intellectual activity at all. The need is that, in order to stimulate interest and effort, problems should be at the highest possible intellectual level at which a child can work. For children of poorer gv ability this need can be met by setting exercises of gF type.

Chapter V

ABILITIES AND THE LEARNING PROCESS

1. Essentials

The first requirement for all who teach, or who aspire to teach, appears to be an appreciation of—

(*a*) the difference between education and instruction,
(*b*) the different levels of ability among children,
(*c*) the different types of ability among children.

2. Education or Instruction

There is a fundamental distinction between education and instruction ; between the concept of the development of talents inborn and individual, and the conveying to a person of a body of information. The transition in schools from "chiefly instruction" to "chiefly education" has been delayed by large classes, but it is taking place.

The views of Dr. Lovell [1] are interesting. He says :

> One must create an entirely new outlook through the basis of education. This is neither difficult nor impossible ; in fact the best modern educational methods already tend to do so. The old methods of rote learning have been superseded. The child is confronted with situations upon which he must bring his intelligence to bear if he is to satisfy his needs. By "intelligence" we mean that problem-solving apparatus with which we are all equipped from birth to a greater or lesser degree, "the capacity to use capacity". . . . Provided problems are of interest to the child they will invariably be attacked from this angle of active investigation. . . . The use of concrete material enables the child to prove the truth of his conclusions by simple checking—that is by independent work. Such methods should be evident in all subjects. The child's work is no longer judged superficially by results but by his sincere efforts to solve his problems according to the scientific method.

Dr. Lovell then criticises the "lecture system" in some universities ; the compulsory attendance at lectures and the lack of tutorials ; and the set work which gives the student little preparation or training for work on his own.

[1] *Science and Civilisation*, by Bernard Lovell (Nelson).

3. Levels of Ability

The transfer of children to Senior Schools at the age of 11 + threw a vivid light on the wide range of attainments that exists among groups of children of the same age. While these differences may be due in some measure to differences between one tributary Junior School and another, it is generally realised that they are due chiefly to differences in innate ability that exist among children. In some Senior Schools classification of entrants is now made on the results obtained from applying a test of intelligence (usually a group test) instead of on the results from attainments tests. The limitations of attainments tests for the purpose of grading these entrants are fairly obvious. Moreover, although it is important in grading to have regard to what a child knows, it is more important to teachers in Senior Schools to have regard to what he is capable of learning. In other words, for grading children at the age of 11 +, ability is a more weighty consideration than actual knowledge. The application to entrants of group tests of intelligence is an effort to grade by ability. Many head teachers of Senior Schools have expressed dissatisfaction with classification made on the results of a test of intelligence. It should be remembered that no test will measure general ability alone. The usual type of intelligence test, in which words are used, measures general ability (*g*) plus verbal ability (*v*). The results of such a test are an indication of ability to benefit from academic education in which the medium used is chiefly words. But in the modern Senior Schools much work is done in the form of practical exercises. The ability to solve practical problems does not correlate highly with the ability to solve verbal tests of intelligence. The consequence is that some children graded B or even C by a verbal intelligence test are found to be superior in some of their school work (*e.g.* in working practical exercises) to some children graded A. Nevertheless we believe that a well-chosen intelligence test of verbal type is the most effective and the simplest means of classifying entrants to a Senior School. Reasons for this belief are set out in the chapter on Tests of Intelligence.

4. Types of Ability

We have said that the ordinary test of intelligence, in which words are employed, will grade children in accordance with their ability to profit from an education through the medium of words. This type of ability we are going to call the *gv* type. A high gv ability gives a highly significant correlation with success in English ; it gives a significant correlation with success in Arithmetic ; it indicates ability to acquire learning from books. A poor gv ability marches with poor attainments in these subjects and with little success in book-learning. Children with low gv ability are those generally in the lowest stream of classes—the Cs or Ds—in the Senior Schools. They are regarded as " dull ". (Technically, " dull and backward " children are those falling within the range of Intelligence Quotients 85 to 70, the line of middle ability being 100.) This label " dull " was affixed because educational exercises in the past have been chiefly in terms of words and because only one aspect of intellect, one type of ability—the gv type—was considered. As we saw in Chapter IV, there is another type of ability, the gF [1] type, which is the ability to deal successfully with things that can be seen or handled. This ability is possessed in high degree by many good gv children, but is also possessed in high degree by many poor gv children. Dr. Cyril Burt [2] states that dull and backward children are lacking in all-round ability ; that they are inferior all round in attainments, showing a greater inferiority in the more verbal subjects and a less inferiority—but still an inferiority—in the more practical subjects. Our investigations into abilities and our observations of attainments do not fully support a part of this statement.

We have seen that, in an unselected group, the dullest of all children (feeble-minded) are practically equal in gF ability to children of middle ability. Indeed, 40% of this group of " feeble-minded " children are above the line of middle gF ability. The ability has been measured with standardised tests. In so far as g is common both to gv and to gF types of ability, there would be a tendency for high gv children to have

[1] *Intelligence, Concrete and Abstract*, by W. P. Alexander (Monograph Supplement to *Brit. Journal of Psychology*).

[2] *The Backward Child*, by C. Burt (University of London Press).

high gF ability too. But also many low gv children have a high gF ability.

For the purposes of the general education of older elementary school children, attention has been drawn in this chapter to two main types of ability, the gv type and the gF type. There are, of course, many special abilities. Some years ago, Cox [1] isolated a special factor which he called m, and he measured g + m—mechanical aptitude. Thurstone [2] has isolated nine primary factors. All teachers know of children who have but one special ability, and they wisely give opportunities for the development of that ability. We shall not, however, in this book consider all these special abilities but shall confine ourselves to the two types that appear to present educational pathways of considerable breadth. The gv pathway at present carries most of the traffic. The gF pathway has not been fully explored, and it is a purpose of this book to tell of some of the efforts at exploration.

5. High Latent Abilities of the Dullest Children

Our investigations into the abilities of so-called mentally defective children reveal a deficiency of verbal ability much more marked than the deficiency in general ability. In general ability exercised through verbal channels and in abstract situations (*i.e.* in I.Q.) these children are of course among the poorest 3% or so of the population. In general ability exercised in real situations dealing with the relationships of things that can be seen or handled they are, on the average, approximately at the same level as children of middle ability. This was found first by observation. Educational methods that would use this strong ability were developed and theories were formulated. Later, Dr. Alexander [3] (with our work unknown to him, and his work at that time unknown to us), by purely theoretical and mathematical methods, using the Multiple Factor Theory, was able to furnish psychological grounds for our practical findings and support the theories we had formulated.

[1] *Mechanical Aptitude*, by J. W. Cox (Nat. Institute of Industrial Psychology).

[2] *Research in Education*, by A. F. Watts (the Third Tibbey Memorial Lecture, Nat. Assoc. of Head Teachers).

[3] *Intelligence, Concrete and Abstract*, by W. P. Alexander (Monograph Supplement to *Brit. Journal of Psychology*).

SUMMARY

General ability (or g) may be said to be the ability to educe new relationships and correlates.

(i) If words are used in measuring ability, the test is one of the relationships of words and of abstract concepts (g + v). In other terms, a verbal test (the Stanford Binet Test is chiefly verbal) measures the flow of intelligence through verbal channels. The results are an indication of ability to acquire academic learning and to benefit from verbal methods. In this respect, these defective children are markedly inferior to children of middle ability (cf. Mean I.Q.s 66 and 100).

(ii) In Alexander's tests,[1] things that can be seen and handled are used, and the tests measure the ability to educe relationships and correlates in visual and concrete situations (g + F). In other words, the test measures the flow of intelligence through practical channels. In this respect these defective children are approximately equal to children of middle ability (cf. Mean P.Q.s 96 to 100).

Further details of this investigation have already been given.

6. Education : Teaching and Learning

Young teachers go into the schools fresh from their experience in secondary schools and training colleges or departments. The medium of their education has been chiefly words. The teaching they received was largely in the form of lectures. They have not always appreciated the fact that any real knowledge and skills that they acquire are the result of their own individual activity and experience in their own studies ; that the purpose of the lectures they received was not generally to impart information, but to direct and stimulate, to show delectable avenues down which they could wander to pick the fruit. But they had to do the picking themselves.

Lecture and oral methods in the elementary schools are not always followed by individual activity on the part of the children. Large classes and lack of books are difficulties. There has thus grown up a tendency to devote much time to oral teaching and to confuse oral teaching, the teacher's effort, with learning, the child's effort. The Reports of the Advisory Committee and the work of psychologists stress constantly that " real knowledge and real skills are acquired by experiences ".

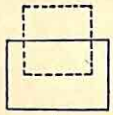
[1] Kohs' Block Design Test (Baird) ; Alexander's Passalong Test (Nat. Institute of Industrial Psychology) ; Cube Construction Test (Nat. Institute of Industrial Psychology).

Teaching, as we understand it, should be generally not lecturing or talking by the teacher, but largely (*a*) the preparation before the lesson period of exercises that afford opportunities for activity by the pupil ; (*b*) the stimulation of interest, *i.e.* the creation of the right emotional environment (in which, of course, oral teaching has some place).

Learning, as we see it, is the pupil's activity (*a*) in observing (one aspect of Experience) ; (*b*) in comparing and contrasting (Relations) ; (*c*) in applying the relationships observed in order to obtain new knowledge (Correlates) ; (*d*) in observing given new " isolates " and bringing them into relation in right sequence with knowledge and skills that have already been acquired (application) ; and (*e*) in planning and thinking in series and sequences.

SPEARMAN'S PRINCIPLES OF LEARNING

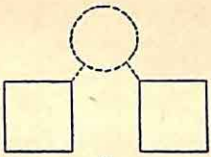
(Diagrams modified slightly by Aveling [1])



1

Principle of Experience.

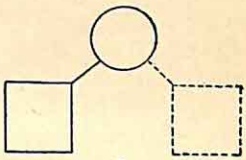
Fig. 1



2

Principle of Relations.

Fig. 2



3

Principle of Correlates.

Fig. 3

In these diagrams the continuous lines represent occurrence, and the dotted lines tendency. Fig. 1 shows the occurrence of experience and the tendency to know it ; Fig. 2, the occurrence of known items of experience and the tendency to apprehend relation between them ; Fig. 3, the occurrence of a known item together with a known relation, and the tendency to think of a correlated item.

SIMPLE EXAMPLES

(i) EXPERIENCE (*a*) *hand* (a word—verbal)

(*b*) (a figure—concrete)

[1] *Psychology, the Changing Outlook*, by F. Aveling (Watts).

There is a tendency to know the word-form " hand " and its meaning ; to know the figure.

(ii) RELATIONS (*a*) *hand* : *finger*

(*b*)

There is a tendency to apprehend the relation between hand and finger (the finger is a part of the whole hand, and an extremity) to apprehend the relation between the two shapes.

(iii) CORRELATES (*a*) As *hand* is to *finger*, so *foot* is to . . . ?
The correlate is *toe*. The application of the relation " extreme part " applied to the known item *foot* gives the correlate *toe*.

(*b*) As is to so is to . . . ?

The correlate is .
The relation applied to the known item gives the correlate.

The learning process may be through activities and experiences with (*a*) words and abstractions (verbal), or (*b*) things that can be seen or handled—visual and concrete (practical), or (*c*) both (*a*) and (*b*).

Teachers are among the intellectually brightest 10% of the population and are able to profit by academic education. They tend to pass on what they have acquired : to perpetuate education through the medium of words. The elder children in the elementary schools are among the remaining 90% for whom generally a practical approach would appear more beneficial than an academic one.

7. The Need for Practical Education

For possibly 90% of the population of a country, life is a practical affair. The business of living, which includes earning a living, is for them dependent upon their practical ability rather than on their verbal ability. Moreover, emotionally their interests lie chiefly in dealing with everyday things and

everyday life. Possibly 10% or so of the population need to deal with abstractions. They enter the professions or do clerical work, and their power to earn a living lies largely in their gv ability. These are the people who, as children, respond well to an education of academic type provided by the present secondary (grammar) schools. Even for them, however, activities and interests are largely practical and everyday.

8. Rise of Academic Methods

The general approach to education in Senior Schools is still chiefly verbal. Education many years ago was only for the few. It was, however, for the intelligent few. It was of academic type. When educational provision was made for all, the verbal methods that had been used for the few were handed down. It is not always remembered that when schools were first established under the Education Act of 1870 they were " places of instruction ", and not only so but places of instruction in academic subjects.

9. Extension of Curriculum Content

The transition in schools generally from academic education to practical education (" practical " in the sense that will be shown later) has scarcely begun. The original content of the curriculum (the 3 Rs) was widened, and has been extended to include some History and Geography, some physical activities, and perhaps a Science. To this have been added the so-called practical subjects such as various Handicrafts and the Domestic Subjects. In these practical subjects at first " instruction " was given, and the term " instruction in Handicrafts and Domestic Subjects " still persists. In many schools there have been developments, and work in the practical subjects is now much more in the nature of education and much less purely instructional. The addition to the curriculum content of practical subjects is apt to create the erroneous belief that practical education is being provided. Is not the situation, even in the most advanced schools,—where educational methods have largely superseded instructional—one in which the education is still chiefly through the medium of words with some work in practical subjects added ?

If this is so, it means that general ability is being induced to flow through verbal channels rather than through what we are going to call practical channels. There are reasons for assuming that 50% of children have practical ability higher than verbal ability. On intellectual grounds, then, for 50% of children, and on emotional and utilitarian grounds for all (except the 10% who will earn a living mainly by use of their verbal ability), there is a case for substituting practical for academic education. By this is meant not just the inclusion of so-called practical subjects, nor the elimination of the so-called academic subjects, but the use of all subjects as sources for educational exercises that are chiefly on concrete, visual, and everyday lines.

10. Curriculum : Building Up instead of Scaling Down

We have seen how, owing to the manner of its extension, education was handed down in academic form to Elementary Schools. This process has been continued within the new Senior Schools. There is generally a scaling-down of the methods and curriculum used with the average group, for use with a " backward " group. The logical method would appear to be first to build the foundations ; to investigate first the innate abilities of those children who are supposed to be the intellectually dullest of all children ; then to plan a curriculum that provides opportunities for using their stronger abilities. This would form a basis on which to build up the educational curriculum for brighter children. Dr. Alexander [1] says :

> A study of the methods used at Lankhills Special School and their appropriate modification for the greater ability which would be found amongst the children in the backward group is, in my opinion, more likely to result in the correct approach than is the method now used of scaling down the methods and curriculum used with the average group ; for is it not true that this process of scaling-down is the fundamental cause of the academic tradition of the elementary schools ? The selective central schools imitate as far as possible the grammar schools ; the senior modern schools strive to attain an academic standard not out of keeping with that of the selective central schools ; the B form struggles to reach the standard

[1] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).

of the A form and the C form clutches vainly at the tail of the B form, *and all the way through the medium is words.*

The phrase in italics is of great significance.

11. Concrete instead of Verbal Situations

The ideal approach appears to be not through the medium of exercises in words, *i.e.* through the verbal and abstract, but through the medium of exercises with things that can be seen or handled, *i.e.* through the visual and concrete. Just working with the hands will not do. The exercises need to be planned by the teacher in graded steps to stimulate children's thought in observing visual relationships. The exercises should stimulate planning and thinking in series and sequences.

12. Educational Possibilities for even the Dullest Children

The finding of the high innate gF ability noted in paragraph (5) among a group of children considered so mentally dull as to be labelled feeble-minded opened up great educational possibilities. These possibilities had in some measure been appreciated and partially realised at Lankhills before Alexander's tests were published. Exceptional standards of attainment in some of the non-academic subjects had been reached by many of these children. Efforts had been made to enable the children to acquire knowledge and skills through the exercise of their intellect in visual and concrete situations, by providing exercises for them to do that would stimulate their greatest abilities.

By progressive teachers Spearman's principles of learning have elsewhere already been interpreted into school practice in terms of verbal and academic education. The conscious interpretation of Spearman's principles into practical exercises, *i.e.* into exercises in educing visual and concrete relationships, in order to build up a whole curriculum planned on these basic principles has, we believe, hitherto never been attempted. Our own first approach was made through a form of Handwork (paper and cardboard work) which entailed much " thinking " in order to achieve a little " doing ". Gradually the same principles were applied to other subjects. The extension of

this technique has made possible for these children a wider and still widening curriculum content.

13. The Freedom of the Senior Schools

Curriculum in most types of schools is governed by the spectre of examinations. The Junior Schools face the Special Place Examination, Preparatory Schools the Common Entrance Examination, Secondary Schools the School Certificate. It is true that many of the Junior Schools achieve a large measure of freedom, partly because of the changed nature of the Special Place Examination, which is now a test of ability rather than of information, and partly because early classification by ability enables use to be made of practical methods with those who are not potential candidates for the Secondary Schools. In the Senior Schools there is complete freedom from the restriction of examinations. No one has said what must be taught or how it is to be taught. There is freedom for bold experiment both in curriculum content and in technique.

Chapter VI

HANDWORK AND CRAFTS

1. Definitions

The terms Handwork and Craftwork do not appear to be synonymous. A *Craft* we interpret to mean skill in the use of a particular medium. Each craft has its own special technique. By *Handwork* is meant any form of manual activity, including the crafts but not necessarily confined to the crafts. For example, much constructive work in paper and cardboard is not craftwork ; it may lead to craftwork, to Book Crafts, Woodwork, or Needlework, but it is Handwork rather than Craftwork, and on the lines indicated in this book it is certainly educational handwork. Some handwork, including of course some so-called craftwork, may be largely manipulative and/or repetitive, and of little real educational value to children.

2. Why include as School Subjects ?

Do we ever stop to think why a subject is included in the school curriculum ? Do we consider, too, why we plan a lesson in that subject in the way we do ? Are both the distant and the immediate aims clear ? We have seen how in early days, in an attempt to supplement academic with practical work, the curriculum of the three Rs was widened to include some form or forms of Handwork. The reasons for choosing particular forms of Handwork were often not considered at all. To-day craftwork in one or more of its many forms—Weaving, Pottery, Book Crafts, Leatherwork, Woodwork (of constructive type or carving), Metalwork, the Domestic Crafts (Cookery, Housewifery, Laundrywork, and Needlework), Canework, Raffiawork, Rushwork, and Plastic Modelling — appears on all school time-tables.

All subjects, of course, need to be considered not just as subjects, but as subjects in relation to a child or to a group of children. There may be some danger of regarding crafts in

particular as subjects only ; of examining the end rather than the means ; of judging the superficial result rather than the activities and efforts of the child in solving problems. A craft, excellent as such, may not be very valuable as a school subject, *i.e.* of high educational value.

It might be helpful if each one of us asked himself (or more frequently herself) the following questions :

(*a*) Is a particular craft included in the school curriculum because—

(i) it is one in which I am skilled ? or
(ii) it is fashionable, and other schools include it ? or
(iii) it keeps children busy and they like it ? or
(iv) the children do " such beautiful work " in it ? or
(v) it is recreative ?

Are any of these satisfactory reasons for school activity in this craft ?

(*b*) Is the medium so expensive that step-by-step instruction (or supervision) is necessary to prevent spoiling material ? If so, do I think sufficient opportunity is afforded the child for independent work, for making, and later correcting, errors ?

(*c*) Is the craft included because of its real educational value ? Is the primary purpose of the manual activity to stimulate intellectual activity ? Or, on the contrary, is the work largely manipulative and/or repetitive, and chiefly just a manual activity ?

(*d*) If I am satisfied that the craft is one that can have a high educational value, am I sure that exercises are planned with such grading, at such intellectual levels, and in such units, that the children in my care can exercise activity so as to make the greatest possible progress and to attain the highest intellectual efficiency possible for each ?

3. Choice of Crafts : Considerations in the Past

The choice of crafts for school activities (when choice has been exercised) appears to have been governed in the past largely by (*a*) the utility of the articles made ; (*b*) the emotional appeal to the child ; (*c*) tradition.

These considerations appear in the following passage from a Memorandum published by the London County Council : [1]

Amid the medley of manual occupations that have been proposed for the schools it is well to hold fast to certain basic principles of selection. To begin with, everything should as a rule lead up to a genuine craft. By a genuine craft is meant a craft which is followed outside the school walls as a means of making articles of utility or beauty. Such crafts are called genuine to distinguish them from bogus crafts, in which objects made are of no use to anybody. Nobody wants to possess them. Nobody wants to preserve them. Their destiny is the dustbin. Much of the paper and cardboard modelling practised in the past belongs to this class. To make pretty and trivial things may be tolerable, or even desirable, among very young children, where the mere joy of making things—it matters not what—is its own justification ; but when this infantile joy begins to wane (as it soon does), the nature of the thing made begins to assume importance. The thing made should be worth making, though sometimes the measure of what is worth making should be the child's measure, not the adult's. The pursuit should fall into line with the primal pursuits of the human race.

To exemplify : Paper and cardboard work is legitimate if it forms part of a graduated scheme which ends in the making and binding of books. Though not a craft in itself it leads up to a craft. It is illegitimate if it ends in the making of furniture which collapses at a touch, of boxes which will hold nothing securely, or of geometrical solids which, except from the mathematical point of view, are devoid of all interest and utility. Used in the legitimate way above, paper work is an eminently suitable form of school handicraft. One of the cardinal aims of the school is to create love of books, and a book-lover's interests are not confined to the contents of the book; they extend—or at any rate they should extend—to its appearance and its structure.

Weaving is another craft of special appropriateness. It is probable that more people in the world are engaged in the textile industries than in any other. And the craft is intrinsically simple. Its essential principle is easy to grasp, and its practice is easy to begin. There are difficulties, too, difficulties which can be so ranged as to make a constantly increasing demand on the learner's ingenuity and invention. And the history of weaving is instructive and stimulating. The child can, in a measure, live through it and not merely hear about it.

The writer of this passage has mentioned the three considerations governing choice of crafts that have been noted :

(i) Utility of the articles made. This gives purpose to work and so leads to a sense of achievement—to emotional satisfaction.

(ii) Emotional appeal to the child. Every teacher knows the

[1] *Handicraft in Senior Girls' Schools, 1935* (L.C.C.).

importance of this—of "creating the right emotional environment". In the chapters on Music and Dancing in this book are notes of lessons planned so that the approach and finish make emotional appeal.

(iii) "Traditional Crafts" is a fine-sounding phrase, often meaning something fine. Are we satisfied, however, that it is a reason for continuing a form of activity—as a school activity—that may have little educational value, and that may have become obsolete in a changing world?

The primary consideration for choosing forms of manual activity for schools has, however, been omitted by the writer of the passage. Activities must surely be selected on grounds of educational value. The basis of the three considerations stated is *emotional*. The basis in considering educational value is primarily *intellectual*.

4. A New Approach: Intellectual Considerations

In our work with dull children we have found it necessary to consider the children before the subject, to observe and investigate abilities and then to plan education to develop those abilities. The poor verbal abilities of dull children are only too evident. Attempts to educate them with an approach through the medium of words meet with little success. We have seen, however, that in their ability to deal with relationships in concrete situations many of even the dullest children are at the same levels as children of middle ability, and that in this respect some are even above the line of middle ability. The obvious approach is by presenting them with concrete or visual situations in which they will have to think. Various forms of Handwork and Crafts and Physical Activities afford opportunities for this.

We therefore approached Handwork viewing it as a means of education. The criterion of the choice of activities was educational value, and this was sifted further still to a consideration of intellectual value. (It will be understood that educational value may include also emotional and aesthetic values.) The fundamental purpose in educating children who appear to have little intellect must surely be to develop such

abilities as they have so that they attain their maximum potential intellectual efficiency. We were not in the first place concerned with crafts as such. It was the means—the stimulation of thought, the intellectual activity in solving visual and concrete problems—that came first, followed by the arrangement of exercises into steps and stages to form a graded scheme. Development on these lines is shown in the chapter on Paper and Cardboard Work, applied later to Book Crafts, to Woodwork, and to Needlework. Without this educational development we believe that the independent work and the fine craftsmanship now shown by children in Woodwork (and in Book Crafts and Needlework) would not have been possible.

The attention to the means has achieved the end, and although primary concern has been not for craftwork as such, craftwork of quality far higher than was expected has been the result.

5. Development of the New Approach

(*a*) Consideration of Handwork as a means of stimulating intellectual activity resulted in our discarding many years ago some of the forms of Handwork then used. Plastics (except for a very few of the youngest children), raffiawork, and canework were discarded. The two last-named are chiefly manipulative and repetitive, and while there may be justification for their continuance as a recreational out-of-school activity, they appeared to afford insufficient real educational opportunities to justify their inclusion in a school time-table for dull children.

(*b*) The approach in the first place was made through exercises in measured work in Paper and Cardboard. The question was : " Is it possible to plan a series of graded exercises of increasing intellectual difficulty to form a whole scheme ? " The exercises were to be of a type in which the manual activity would stimulate intellectual activity—planning, thinking in sequences, grasping relationships. It was found possible. Over some years a scheme was developed, not at first craftwork, but having a distinct bearing on the craftwork with wood, and later applied to Book Crafts and Needlework.

(*c*) When Woodwork was considered, another problem arose. Woodwork of constructional type is a craft, and in

common with all crafts has an appropriate technique of its own. For success in Woodwork it is necessary to acquire skill in the technique of making joints. The question arose as to whether or not these dullest of all children had the ability to acquire the correct technique and to use it independently. If not, the obvious course was to adopt some other form of Handwork or Craftwork, which was within their abilities, rather than to debase the craft to the level of hammer and nails and thus to miss educational values. An account of the trial made and of the scheme adopted in this craft is contained in a later chapter.

(*d*) Eleven years ago, when the school was extended to provide places for girls, work in the Housecrafts (Housewifery, Cookery, Laundrywork) was planned. Over a period of years the schemes have been developed. Always the aim has been for the teacher to plan for the children to work independently at exercises of progressive difficulty entailing the grasping of an increasingly complicated series of relationships. A very full account of this work is given later.

(*e*) The whole Needlework scheme was re-cast a few years ago, because work in the scheme in Paper and Cardboard had not interested the girls so much as the boys, perhaps because for the girls it appeared to lack purpose. For some years the boys seemed to be better able than the girls to deal with new concrete and visual situations, in doing everyday jobs of work. Their education appeared better. Effort was then made to use Needlework as an educational channel, as a subject in which there would be progressive exercise in planning. In our minds were the words "constructive rather than manipulative". Later it was found possible to reintroduce for girls some measured work with paper and cardboard—successful because it had a bearing on the Needlework, and because it included, by now, some work in book crafts. (A full account is given in the chapter on Needlework.)

(*f*) This planning, with the aim of stimulating mental activity (primarily intellectual, but emotional too), was extended to subjects other than Handwork and Craftwork. Visual methods rather than auditory methods were used whenever possible. Accounts of the development of work and of children's attainments are given in the chapters on Country Dancing, Physical Education, Art, and School Gardening.

Arithmetic had from the first a concrete approach. English was made purposeful, and applied to exercises in practical subjects. For example, in order to work independently in the Cookery Class, it is necessary for a girl to be able to read recipes easily ; to grasp printed instructions and carry them out ; and to calculate and weigh accurately. The boys in their Handwork lessons find it necessary to read and understand written instructions, and to calculate and measure accurately.

6. Consideration of Some Crafts

Many teachers attending courses at which I have been privileged to lecture have put forward arguments in favour of the inclusion of certain crafts in the Senior School curriculum. Much depends on the individual teacher, on the planning of exercises for the children, and on the children's methods of work.

WEAVING : appears to be a form of craftwork that is popular in schools. Among the arguments put forward in its favour are :

(a) *It is a traditional craft.* The reply to this has already been given.

(b) *More people in the world are engaged in the textile craft than in any other.* People engaged in this industry do not generally use the methods that are used in schools.

(c) *It is recreative.* This may mean that it is of recreational value in school or of value as a training for leisure. In support of work of recreational value in school, some teachers have urged the need for craftwork of a sedative type for their A children. We all know men and women of the brain-worker type who find relief and joy in working with their hands at tasks which, for them, require little or no intellectual effort. It is, however, difficult to justify the devotion of all too short school hours in the Senior School to sedative occupations. Secondary School children have to devote some out-of-school hours to intellectual activity. The out-of-school hours of Senior School children are filled often with ready-made amusements—frequent visits to the cinema, the incessant wireless in some homes—amusements requiring no effort, and stimulating no intellectual activity. If justification on the grounds of

" training for leisure " is pleaded, it behoves us to ask how many children have at home (or can afford to buy) weaving apparatus and sufficient material to keep them employed for a few hours each week.

(d) *The results of the work are useful.* The word " useful " needs a wide interpretation if it is to include some of the results not only of weaving but also of other crafts. Some of the fabric woven is of little real use, and a superior article, machine-made, can sometimes be bought for less money than the materials used for weaving. Immediate and direct utility is in any case a dangerous ground on which to justify any school activity. It stresses the superficial result, and ignores the type of effort through which real learning and real skills are acquired. It may, moreover, prove to have a boomerang effect, because the public may come to assess the value of any school activity by the criterion of immediate utility of the result.

Justification of weaving as a school activity appears to lie in none of these arguments. If weaving forms part of a whole Arts and Crafts scheme, if there is a graded scheme in Design, if original designs are drawn by a child herself and then woven (a form of Applied Design), there will be educational value in the activity. If, further, the fabrics that are woven can be utilised in a whole furnishing scheme, problems of both intellectual value (relationships) and aesthetic value are presented. Weaving is, however, largely manipulative and repetitive work, and wise teachers guard against the danger of any individual child giving an undue proportion of valuable school time to such an activity.

POTTERY : there may be reasons for including this craft in a Senior School curriculum. The proximity of a school to a pottery works (or " pot bank ") may give this work a pre-vocational value. The craft affords opportunities for work in Applied Design. Some of the pottery made in schools can hardly be regarded as useful, because unless a costly glost-oven is available, the glaze is lacking or unsatisfactory. If pottery-work in schools has neither pre-vocational nor utilitarian value, can it be justified on educational grounds ? It is work of manipulative rather than of constructive type, and it is a craft that does not appear to afford opportunities for the planning of intellectual exercises of graded difficulty.

LEATHERWORK : beautifully finished work in this craft is done in some schools. The objection to this work, not as a craft but as a school activity, is the high cost of materials. The craft appears to give opportunities for planning, for exact measurement, and for applying Design work done in the Art lessons. The question asked in paragraph 2 (*b*) of this chapter needs consideration.

7. Handwork and Crafts considered in Later Chapters

The following forms of Handwork or Craftwork are discussed at length in later chapters : Paper and Cardboard Work (including Book Craft), Woodwork, the Domestic Subjects (Cookery, Housewifery, and Laundrywork), Needlework (which is of course one of the Domestic Subjects but which is given a separate chapter), Art (part of which, Design, and the Applied Design especially, is rather in the nature of a craft).

Chapter VII

PAPER AND CARDBOARD WORK

Many teachers who have attended courses at this school, or who have visited and seen both the finished work of children and children actually working at various stages of this scheme, have felt that they do not know how to begin work on these lines in their own schools. For this reason an account of how the work was begun at Lankhills and of how the scheme has been developed is given in this chapter. We would stress the point that in all new ventures with these dullest of all children the steps in the early stages have had to be very small, and progress at first is hardly apparent. After technique has been acquired, the rate of progress gradually accelerates until it is little different from that of children of middle ability. It is as if one were pushing a huge solid sphere. A great effort is necessary at first in order to overcome inertia, and then with decreased pushing the ball moves with gathering speed. Effort is needed on the part of the teacher to stimulate the emotional interest of children, and then to maintain that interest by providing variety in exercises so that there is a process of re-vision that is not merely repetition. We have found that this is true not only in the approach to this subject but in the approach to Country Dancing, to Art, to Needlework, to Woodwork, (*q.v.*) and to other subjects.

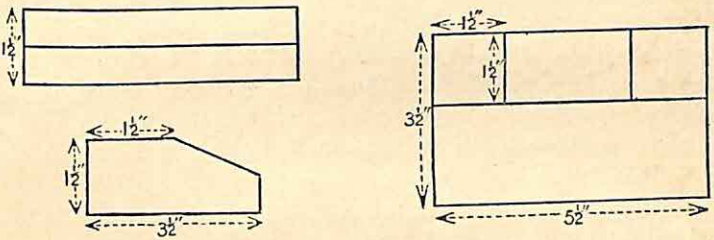
1. The Growth of the Scheme

(*a*) The first scheme in this subject was drawn up fifteen years ago for elder boys only. It consisted substantially of Stages (1), (2), and (3) of the present scheme (*q.v.*) less the binding craftwork. Very little time was spent at Stage (1) with these elder boys. The boys were keenly interested and worked well. Stage (3) included for a time elaborate exercises. Some boys made beautiful replicas to scale of the dining-hall block and of the schoolroom block, the latter consisting of two buildings set at right angles one to the other, one of the buildings being

classrooms of the semi-open-air type. These elaborate exercises were later omitted.

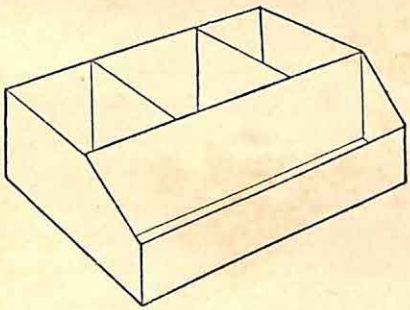
(*b*) The subject was introduced nine years ago into the curriculum for elder girls. It was withdrawn after an eighteen-months trial because the girls made such little progress. The lack of progress was thought to be due to lack of emotional drive. The girls were not interested. The boys seemed interested in solving the problems offered and in doing the constructional work ; moreover they applied the skills acquired to their Woodwork. For the girls, the activity appeared to lack purpose.

(*c*) Development of the scheme beyond Stage (3) was due to the fact that one morning seven years ago the teacher of this subject was almost overwhelmed with clerical work. She therefore put this on a blackboard :



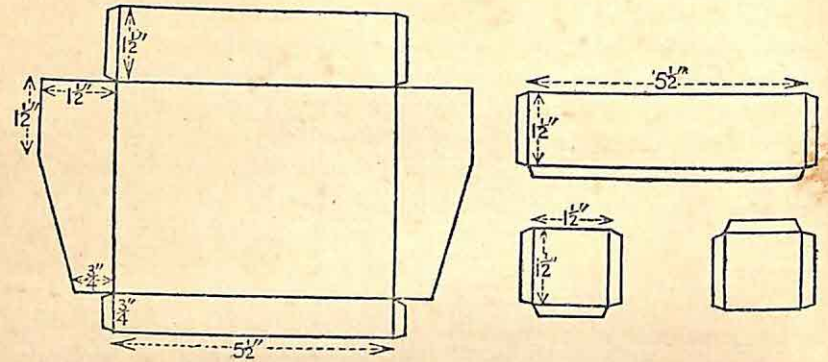
Make this model.

By the end of the lesson three-quarters of the boys in the class (I.Q. Range 54–74, Mean 66) had produced this :



We noted that in order to do so they had had to translate

a three-view drawing of an object into a development of it, thus :



and they had had also to see the relationships of the parts of the development one to another, in order to leave flaps in the right places. At the end of the lesson we noted that this exercise entailed more abstract thought than did work at Stage (3) where an actual building or an actual object is seen. In this exercise an unnamed object had to be visualised from a three-view drawing of it.

We noted, too, that the next step, more abstract still, appeared to be the making of models of objects from written description. This step was incorporated in the scheme, split into two stages, a short stage of making models from description actual size, at which only one or two exercises would be necessary (Stage (5)), and then a stage of making models to scale from written description (Stage (6)). Later still the exercises at Stage (6) were graded in order of difficulty. When Stages (4), (5), and (6) were included, the longer and more elaborate exercises at Stage (3) were omitted.

(*d*) (i) Seven years ago the Junior Boys began work on this scheme. It was then found that an introductory stage was necessary to come before the simple Stage (1).

Though rather more than one-third of the Junior Boys' class were unable to use a ruler or even scissors, the brightest third of the class could measure fairly accurately. Interest had to be stimulated. A form of the Project Method was used. A farm was made. The class was grouped into three sections (A, B,

and C). Section A made the buildings, working from individual cards. Section B made the repetitive objects, at first working with the teacher from the blackboard : fences, posts, gates, simple buildings like pigsties. Section C made the animals and figures by using three-plywood figures as templates. The templates had been cut for them by elder boys.

Other projects were carried out—the Street, the Railway, the Three Bears, a Doll's House with furniture. At the commencement of each project exercises in English and Number were given a bearing on the chosen centre of interest.

Only the initial approach for the whole class was made by projects. Projects are no longer carried out. The Junior Boys' class is fed by a few new boys each term, a few older ones passing up into the next class. The approach now is on the lines set out in the following notes on the elaboration of the outline given in the schemes. For a complete new class commencing this work, a Project Method or approach might be found desirable.

(ii) A number of individual exercises on cards were drawn out by the teacher. The boys would not have been interested in just drawing lines of given length, but they were interested in exercises in measurement that enabled them to build up a picture in coloured paper, as in Fig. 1.

Boys measured and cut out parts, as in Fig. 2 :

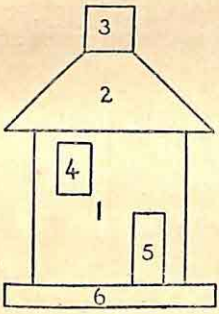


Fig. 1

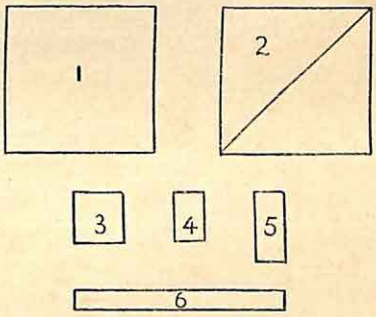
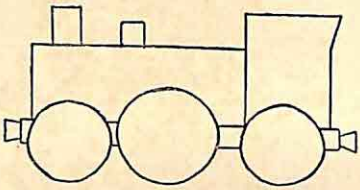
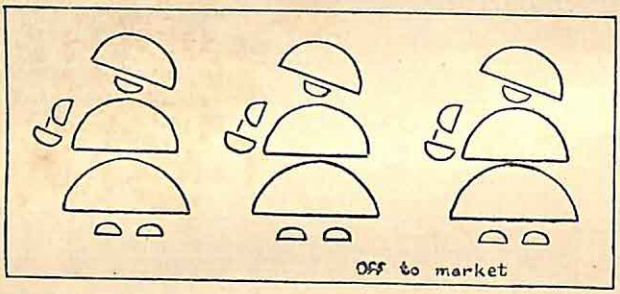


Fig. 2

and then built up the picture like the original. (There are other similar exercises of graded difficulty.) Another form of exercise used is to measure and draw on plain paper (using

rulers, set squares, and compasses) a picture given in colour on a card, and then to measure and cut out the parts in coloured paper and gum them on the drawing. After the parts have been stuck on, any inaccuracy in measurement is obvious. Two examples of this type of exercise are given. (Other exercises are : a Waggon, a Cart, etc.)





The purpose of all this work is to enable these very dull younger boys to acquire the technique of measurement without being bored with the necessary repetitions. This technique of measurement and of interpreting drawings is made use of in their Woodwork (*q.v.*).

(*e*) Exercises in Binding Crafts were added at Stage (2) (working from diagrams given on individual cards) and at Stage (6) (working from written description). The motive behind these additions was to give added purpose to the scheme.

(*f*) This work was then reintroduced for girls (one half-hour per week at first). The elder girls, of course, progressed through the scheme fairly quickly. For them much of the model-making in Stages (3) to (6a) is omitted, and they pass on to simple book craft. The technique they acquire is used in their Needlework (*q.v.*).

2. Elaboration of the Outline given in the Scheme

At these earliest stages the very dull younger children at this school need much repetition, but brighter junior children and C stream Senior School children will need far fewer repetitions, and may even be able to dispense with them altogether. They should progress through the scheme individually as quickly as they can. These notes should be read in conjunction with the scheme that is given later.

(a) *The earliest Stage—Stage (1) and Pre-Stage (1):* The ordinary ruler, marked in half-inches, quarter-inches, eighths, twelfths, etc., is very difficult for children to understand. It is therefore advisable to make a set of cardboard rulers marked just in inches, with no extra pieces at the ends, and no numbers. The child then learns to mark inches from one dividing line to another, and thus the common fault of measuring to the numbers will be eliminated.

After the ordinary use of kindergarten insets, children can draw lines by using a cardboard ruler. It may also be found useful to have a set of plain rulers made in the Woodwork room, and the teacher can mark on them inches and component parts as required. Later the children can make their own cardboard rulers and mark the divisions.

Skill in accurate measurement is essential. In order to obtain this the preliminary exercises in simple measuring must be repeated frequently. This can be made interesting by embodying the same unit of measurement in many different patterns and models. If painted, patterns involving the use of inches only accentuate the accuracy or inaccuracy of the ruler work, and inspire even young children to repeat the work if it does not look right. In the early stages, $\frac{1}{2}''$ squared paper may be used, and can be replaced later by plain paper.

SUGGESTED EXERCISES

(i) Mark a page off in inch squares—mark dots on four sides, and join dots. Colour squares.
(ii) Same exercise—cut up and make patterns with separate inch squares.
(iii) Same exercise—draw diagonals—paint.
(iv) Make band patterns of No. (iii).
(v) Same exercise—cut out triangles—arrange as patterns.
(vi) Band patterns involving more accuracy.

(vii) Draw 4″ squares, varying patterns—colour.
(viii) Block letters—on foundation lines 4″ apart.
(ix) Designs for book covers.
(x) Roman numbers I-XII. Use for clocks or games.

In addition to these exercises, pictures can be made—colour-washed shapes, etc., either by mounting or by using coloured gummed paper.

Similar exercises using fractions of an inch are set. Concurrently with this course of measuring, models in paper can be made. Simple objects involving the use of inches only can be measured and made. In the folding and making of these models, children can see for themselves whether or not they have measured correctly. Self-criticism and self-correction are always encouraged.

Examples of exercises are as follows : Labels for the school shop ; luggage labels for children's own cases, or for parcels in shop ; needle-cases for the girls' needles ; cases for the boys' cigarette cards ; familiar objects seen at home, *e.g.* square basket, oblong basket, fern pot, trays, picture frames, boxes, lanterns, knife-box, etc.

A " centre of interest " can be used through several lessons. (Note that in these centres of interest the work in all subjects is not focussed in one direction as is the case in projects.)

SPRING : baskets, tools, sheds.
WINTER : sledges, shovels, coal-scuttles, lanterns.
SEASIDE : tent, bathing-machine, lighthouse, boats, pier, shelters.
FARM : barn, stable, tools, carts.
HOME : various articles of furniture.
WASHING DAY, CLEANING DAY, BAKING DAY : utensils and furniture.

These handwork models have been correlated with History, Geography, Story Lessons, *e.g.* :

HISTORY : Castle, shield, sentry-box, crown, chariot.
GEOGRAPHY : Cradle, canoe, moccasin, sedan chair, Japanese rickshaw (wigwam).
STORY LESSONS : Three Pigs—house furniture.
Cinderella—stool, coach, clock, palace, wand, mousetrap.
Peter Pan—cradle, tent, bed, boat, Wendy's house, kite, clock.

Many books are published dealing with paper-folding. The models from these books can easily be adapted for use in conjunction with measured work. Instead of folding the paper

into the required number of squares or sections, measure off in inches and mark the squares, etc., in pencil, and speak of inches and work in inches instead of in squares.

In this way models have been made on the Square Box basis (cart, box, cupboard) ; the Oblong Box basis (clock, cradle, basket) ; the Barn basis (barn, cottage, shop, bathing-machine) ; and the Cube basis (box, stove, arm-chair, biscuit-tin).

(b) *Stage (2) :* Actual objects are made from developments given on individual cards, the finished size being given. These can be repeated in half and quarter size, so that the children learn to calculate their own measurements. At this stage the teacher usually omits flaps on the assignment card, in order that the children may visualise the object from the development, think for themselves how and where it will fit, and themselves devise the necessary flaps.

From the actual models they have made, the children draw their " three-views " plan and elevations. This needs careful explanation, *e.g.* pushing through a sheet of glass, or against a folded sheet of paper. The correct positions, and the way to obtain these by means of extended lines, should be emphasised.

Children actually measure the finished object, and check afterwards by placing the model on their drawings. The boys use plans and elevations in their work in the Woodwork room.

(c) *Stage (3) :* This stage involves the making of three-view drawings, of translating them into developments, and then making models to scale of actual furniture and actual buildings. In each instance the method entails making a rough sketch of the front and side views, drawn very roughly in a note-book. On these sketches children mark the actual measurements. From them they work out the necessary scale measurements and note them on the rough sketch. They then make the parts and fit them together.

(d) *Stage (4) :* This stage appears difficult, but after the first three stages have been worked through, it offers in practice little difficulty. The three-view drawing is given to children, and from it they have to visualise the object.

Exercises at this stage entail more abstract thought than at Stage (3), because at Stage (4) an object has to be visualised from the three-view drawing of it. The actual object is not seen.

(e) *Stage (5) :* A description of a model is given, for example a matchbox, to be made actual size. This entails comprehending the instruction, drawing a rough sketch usually of the three views, inserting measurements, and making the object. Here is an example of an individual card :

> Make a matchbox with inside measurements $3'' \times 2'' \times 1''$.
>
> When you have finished your model, draw the development in your book. Draw also the plan and elevations.

(f) *Stage (6) :* It will be seen that the exercises at this stage present a series of problems in grasping relationships :

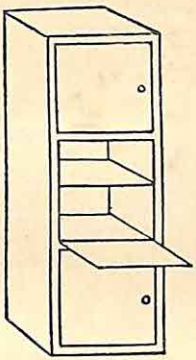
(i) between a written description of an object and the visual image of it,
(ii) between the visual image of an object and its development,
(iii) between actual measurements and scale measurements, and
(iv) between the several parts of the development so as to judge where flaps should be left for joining.

It is interesting to watch a group of boys working at this stage ; each, of course, doing a different exercise. After reading the description one will sketch a picture view of it. Another will omit that stage, the mental image apparently sufficing, and will sketch immediately a three-view drawing. A third will omit both stages, and will make a rough sketch of the development directly from the written description.

Example of card :

> KITCHEN CABINET
>
> Make a kitchen cabinet 6′ high, 2′ wide, and 1′ 3″ deep. It has 3 sections. The top part is a cupboard 2′ deep. The middle cupboard has a flap-down table. The bottom cupboard is 2′ deep and has one door.
>
> Each cupboard has one shelf.

Here is a drawing of the object described (this is, of course, not given to the child) :



3. Attainments of Children

Children work through the scheme at their own individual rates. Rather more than two-thirds of all the boys at Lankhills (Range of I.Q. 54–74, Mean I.Q. 66) reach the stage of working exercises at Stage (6) of this scheme during their last year, or two years, or three years, at school. Work is accurate to a very fine degree. Boys working at this stage take generally from three-quarters of an hour to two hours to complete an exercise.

The time per week devoted to this subject is as follows :

ELDER BOYS : 2 hours to $2\frac{1}{2}$ hours per week (according to section).

ELDER GIRLS : (chiefly for technique of measurement and simple book craft). 1 hour to $2\frac{1}{4}$ hours per week (according to section).

SUGGESTIONS FOR STUDY

These were notes contained in the original memoranda supplied to teachers attending courses at Lankhills, and they have formed the basis for this chapter. If a teacher or student himself makes one or two models, or works one or two exercises at each stage, the whole scheme will become clear.

(*a*) See examples of completed work set out in stages. Look

through the scheme one stage at a time, having before you the completed work illustrating the stage.

(*b*) Observe classes at work to see methods.

(*c*) Examine stage by stage the exercises drawn out on cards by the teacher.

(*d*) Books :

STAGE (1) : *Practical Suggestions in Paper Modelling*, by Mary James (A. Brown & Son Ltd., Farringdon Avenue, E.C.4).
Paper Modelling for 6-year-olds, by Clare Craig (Brown).
Simple Paper Modelling, by H. E. Butler (Philip), Parts I, II, III.
Modelling for the Standards, by H. Bedford (Philip), Parts I & II.
Paper Cutting and Modelling for Infants and Juniors, by J. E. Tolson (Pitman).

The above books suggest folding squares to required sizes, etc. To meet the requirements of this scheme, the paper should be measured.

STAGES (1) & (2) : *Ruler Drawing*, by David Graham (McDougall).

STAGE (2) : *Handwork Arithmetic Tests*, Junior and Senior Sets, by Walter Higgins (McDougall). (The models can be made and used without using the tests.)
Paper Cutting and Modelling for Seniors, Wainwright, Bartlett & Glock (Pitman). (A few models are suitable, others are too advanced.)
Paper Cutting and Modelling for Seniors, by Bernard Pring (Pitman).
Individual Work in Cardboard Modelling, by W. N. Matthews (Pitman), Books I & II.
Model-making in Cardboard, J. Thorne (Charles).
Cardboard modelling, by C. W. Boxall (Charles).
Binding Crafts for Juniors, F. Davenport (Pitman).
Binding Crafts for Seniors, F. Davenport (Pitman).

STAGE (3) : Requires no textbook.

STAGE (4) : The three-view drawings can be made from any model that has been made in the earlier stages.

STAGE (5) : Descriptions are made by the teacher from actual objects, *e.g.* matchbox, sugar carton, etc.

STAGE (6) : Descriptions of unknown objects are given on cards made by teacher. Advertisements in furniture catalogues, newspapers, etc., supply the ideas.

TOOLS

Cutting nibs or print-cutters can be purchased from school contractors (*e.g.* Philip & Tacey or Rudds). They are inserted in ordinary penholders and for this work are more efficient than knives.

To obtain the best results and to avoid damaging furniture, they should be used in conjunction with metal-edged rulers and either zinc plates or wooden cutting boards.

4. Scheme in Paper and Cardboard Work

Work with these media is a particularly valuable means of education because—

(i) it is constructional rather than manipulative,
(ii) it entails much mental effort in proportion to the manual effort,
(iii) it is progressive from the concrete and visual to the abstract.

Further, the media are cheap, and no special accommodation and few tools are necessary.

STAGES OF SCHEME

STAGE (1) *Elements of Measurement*

(i) The Inch. Mark paper off in inches both ways ; draw lines ; colour the squares ; cut these out and stick in books. Many cards with different patterns prepared by teacher for the children to copy. With very dull children it is absolutely essential to continue work at this stage until they can measure inches accurately, use scissors, and do colour work neatly. The varied cards obviate monotony.
(ii) The Half Inch, working on similar lines.
(iii) The Quarter Inch. (Method and exercises employing variety to maintain interest must be used. Numerous exercises are necessary for defective children to acquire facility in measurement.)
(iv) Other fractions of an inch—$\frac{1}{8}$th, $\frac{1}{12}$th, $\frac{1}{16}$th.

TYPES OF EXERCISES

(i) 1. On $\frac{1}{2}$" squared paper make patterns. Copy from cards (use ruler for lines).
2. See measured work in Number and Mathematics Scheme.
(ii) Make up own patterns. Colour. At first tell children colours to use ; children later choose own colours, teacher criticising and suggesting.
(iii) Measure patterns from given picture cards. Draw (using ruler and set square), cut out, colour, and mount in books.

(*Note.*—Originally gummed coloured paper was cut out in this way and mounted. Now it is too expensive.)

(iv) Make a graded series of ruled drawings on plain paper (using ruler and set square) : capital letters of different sizes, bus tickets, mats, gates, etc.

(v) Make simple articles (measured and cut out) : show card, newspaper wrappings, labels (various sizes and shapes), windmill, etc. In Junior classes use project method to start with, *e.g.* farm, street, railway. Correlation with lessons in Number work.

STAGE (2) *Introduction of Simple Scales*

(i) The making of paper models half and quarter size of those made under Section I.

(ii) The making of models from individual cards—doorsteps, bath, vase, etc. Plans and elevations are drawn, taking the measurements from completed models.

(iii) Introduction of Binding Crafts

General exercises for all-over pasting and binding corners, *e.g.* dinner mats, book-markers, treasury-note cases, comb cases, etc.

Making of calendars ; folders for pictures ; various blotters.

Various portfolios : holdalls with hinged sides. Loose-leaf books, *e.g.* snap-book, autograph-book, postcard album, cigarette-card album. Quarter and half binding. Correlation with Art Scheme for decoration, etc.

STAGE (3) *The Making of Models* (first in paper, then repeated in cardboard) to scale of actual objects and buildings. The method is as follows. Note that children work individually on different objects.

(i) Make rough sketch of elevations and plans.

(ii) Measure actual object, and mark measurements on rough sketch.

(iii) Work out measurements to scale and mark these scale measurements on rough drawing.

(iv) Make drawing to scale.

(v) Correlate with Woodwork Scheme.

STAGE (4) *The Making of Models* from given unlabelled three-view drawings. (This entails drafting developments from three-view drawings, *e.g.* of pen tray or cupboard.) Note that these

exercises entail more abstract thought than those in Stage (3), because in Stage (3) a concrete object is seen. At this stage an object has to be visualised from a three-view drawing.

STAGE (5) *The Making of Models* to actual size from description, *e.g.* a matchbox (see card given earlier). This stage needs only one or two exercises.

STAGE (6a) *The Making of Models* of unknown objects to scale from description. This entails reading and comprehending the instruction ; visualising the object in the flat (" development ") ; calculating the measurement to scale ; drawing the development ; fitting the development to form the solid object.

At this stage there is nothing in the concrete (no actual object as in Stage (3)), nor is there assistance to the visual process (as in Stage (4), where three-view drawings are given). Work is more purely abstract.

The articles made from description are mostly articles of furniture. They are graded into four sections according to difficulty both of construction and of measurement. The following have been made :

SECTION A	
wardrobe	bookcase (top part glass doors)
SECTION B	
chest of drawers	tallboy cupboard
dresserette	kitchen cupboard
SECTION C	
chest for kitchen	dresser
cupboard for kitchen	double cupboard
cupboard with glass (cello-phane) doors	kitchen table cupboard
	sideboard
SECTION D	
writing-bureau	music stool
writing-table	work-box table
cupboard for flat	bookcase and writing-desk
dressing-table	

(See sample assignment card for Kitchen Cabinet, given earlier.)

STAGE (6b) *The Making of Book Covers*, portfolios, etc., from written description. This entails reading and comprehending the instruction, visualising the object in the flat (" development "), calculating the requisite amounts of the various

Chapter VIII

WOODWORK

1. Suitability as a School Activity for Very Dull Children

Fifteen years ago work in this subject was started at Lankhills. Before that, our visits to several Special (M.D.) Schools for boys had revealed that in each there were classes in Woodwork. In some classes there was no proper preparation of wood (planing and squaring) but the boys appeared to get some enjoyment from working with hammer and nails. In some of the classes for older boys wood-carving was practised, with pleasing results. Only two of the classes visited showed articles that were what may be termed " properly jointed ". The joints were simple in type and were the work of only a few of the boys in the class. In each case the instructor stated that in the making of jointed articles he had had to give a good deal of help. The work did not approach in quality or in independence that of well-taught boys of middle ability. It appeared, however, to have some value to the boys doing it. The boys made great efforts, and found some joy in achievement. One can imagine even a fairly well-made article representing little effort by a bright boy, and a very poor-looking result representing prodigious effort on the part of a feeble-minded boy.

When Woodwork was first included in the curriculum at Lankhills it was in the nature of a trial to test its suitability as a means of education for boys of this very low intellectual level. It was decided that unless the boys were found capable of acquiring a sound technique for working with wood—of making the wood true, of making articles embodying accurately-fitting joints, and of working fairly independently and without any operations by the instructor on the articles being made—then Woodwork classes would not be continued.

At first progress was almost insufferably slow. At the end of one year it could be seen that some boys were capable of acquiring some technique. Three years' trial showed that some boys could work sufficiently independently for the subject

materials (cardboard, cover paper, linen, etc.), drawing out the development, assembling the parts to form the portfolio or cover. In some cases the cover papers, etc., can be decorated in the Art lesson.

Examples of cards :

HOLDALL

Make a holdall for your books. When closed it is $8\frac{1}{2}'' \times 13''$. The front of the holdall and the top flap are 6″ high, this overlap being necessary when the bag is full.

Fix hinges with 4 folds at the side, the same height as the front. Bind all the edges with cloth (except top of hinges) —finished width $\frac{1}{2}''$.

Cover the outside with pieces of covering paper, leaving $\frac{1}{4}''$ margin all round.

Fasten holdall with tape, slotted through the back and tying in the front.

STATIONERY HOLDER

Make a stationery holder, with blotter and writing pad.

It is in book form, one half holding pad, the other blotter.

When closed it is $8\frac{1}{2}'' \times 6\frac{1}{2}''$ with hinge 1″ wide. Make the blotter separately and fix.

BOOK COVER

Make a book cover in half binding $8'' \times 6''$.

It is hinged on the left side, and ties with a tape on the right side.

The scheme can be extended for use with children of higher intellectual level :

(i) by spending less time at the preliminary Stage (1). Bright children require far fewer exercises to acquire facility of measurement,

(ii) by using at Stage (3), when models of buildings to scale are made, instruments, *e.g.* altimeter for finding heights of buildings, water-level for finding slopes,

(iii) by adding a further stage entailing the geometry and development of cylinders, cones, and the like, *e.g.* flour scoop made from description entails the drawing of the development of a portion of a cylinder, and the handle correspondingly a truncated cone.

to have educational value, but the rate of work was still very slow.

After several years' experience, our view now is that about a half of all the boys who come to this school (I.Q. range of all the boys is about 54–74, Mean I.Q. 66) do not acquire sufficiently good technique and sufficient speed of work to make the subject worth while for them. The Senior Boys' Class is divided into three groups of ten boys each. The C group is composed of younger boys, who, as they get older, pass according to ability into two parallel classes, A and B. All the C group boys and the A group boys attend Woodwork classes, two sessions per week each (a total of $4\frac{3}{4}$ hours for each boy per week). An A group boy, by the time he leaves school, has attended Woodwork classes for about three or three and a half years. The B group boys (*i.e.* those of lesser ability) do not attend Woodwork classes.

2. Standard of Work Reached

Many well-made, finely-finished articles of furniture have been produced. Beside me as I write are some beautiful pieces completed during the last two years :

(i) an upholstered music stool in oak,
(ii) a low rectangular table in oak, with a shelf for books or afternoon tea,
(iii) a floor lamp standard,
(iv) a firescreen, oak-rounded top frame with glass-enclosed embroidered design made by one of the girls,
(v) an octagonal afternoon tea-table in oak, the top with an inlaid design,
(vi) two oak firescreens, of different designs ; other small tables ; a smoker's cabinet ; a swing mirror.

A survey made to-day shows that the eleven boys in A section are at work making the following articles :

(i) corner cupboard (tongue and groove ; mortice and tenon ; rebating for glass ; chip carving ; fixing hinges),
(ii) music stool, upholstered top (haunched M. & T. ; short stub tenons),
(iii) and (iv) two oak trays inlaid with boxwood, different designs (one mitred and one dovetailed),
(v) and (vi) two cabinets with drawers, different designs (one mitred and one dovetailed),
(vii) knife and fork box (dovetails and stopped housing),
(viii) small chest of drawers (dovetails, stopped dovetails, housing),
(ix) stool (haunched M. & T.),
(x) nail-box (dovetailed),
(xi) tie-box (dovetailed).

In the C section there are at present 13 boys, some just starting woodwork. They are making :

(i) plant-stand with splayed chamfered legs (rails haunched M. & T.) in pitch-pine,
(ii) box, oak, with inlaid top (dovetailed),
(iii) and (iv) clothes-horses (wedged M. & T.),
(v) nail-box (T. & G. ; stopped housing ; halving),
(vi) and (vii) hanging bookshelves (stopped housing),
(viii) and (ix) egg-stands (housing),
(x) dibber (wedged M. & T.),
(xi), (xii), and (xiii) plant-stands (half lap).

The work of the boys in A section and of the more advanced boys in C section has reached a standard equal to that of well-taught boys of middle ability. All the joints are close-fitting. The work of a few of the A section reaches a standard of fine cabinet work, the standard reached by the best few of the top A class boys in a Senior School. All the marking-out is done by the boys themselves, and the teacher does not touch the wood.

Recently a boy (aged 15, I.Q. 70) was asked to make two luggage stools with slatted tops (to go at the foot of twin beds in a guest-room). He was told that they were to be a little lower than a chair, and big enough to take a suitcase, and he was asked to submit a sketch showing measurements. Later in the day he brought his sketch giving measurements and method of construction. His first draft showed a suitable article. Questioning revealed that he had measured the height of a chair and that he had borrowed and measured a suitcase. He was told to make the stools exactly as in his sketch, and to finish them a natural colour wax-polished. With very little guidance he produced the two stools. The whole of the workmanship was of craftsman standard. This boy was, of course, exceptional, and would perhaps be exceptional among boys of middle ability ; but his I.Q. was only 70. He had over some years developed the power of independent work. The feature of the Woodwork is not, however, the outstanding work of one or two boys, but the high general level of the work.

Several head teachers attending the conference courses have expressed views that the standard of work is on as high an all-round level as that obtained from their oldest A Stream

boys, but that a few A Stream boys are better than these top-class mentally defective boys. Our view is that the rate of work of these boys is much slower than that of normal boys. (We have taught normal boys woodwork.) The visiting head teachers, seeing the beginning and end of a session, say that the amount of work done in the time is as much as that done by an average boy in their top A classes. The rate of work certainly *appears* much slower, but work is continuous and without waste of time.

3. Basis of the Scheme of Work

The scheme is planned in a series of steps or stages. Each boy works through it at his own rate. At each stage a new joint is (or new joints are) introduced. Boys make articles embodying the joint. If a joint is badly made, a different article embodying the same joint is made. Interest is thus maintained. From the boy's point of view he is making something fresh. From an educational point of view he is repeating an exercise to develop skill. All the boys in the present A class are at Stage (4) or beyond in the scheme, and are working in hardwood. This means that the early part of the scheme (to Stage (3)) has taken from twelve to eighteen months to complete. Until five years ago the boys doing Woodwork made formal drawings—isometric and orthographic projections—in the Woodwork room. The drawings, in very large books, were beautifully neat and accurate. There is always a temptation to continue with work that gives a good-looking result. This temptation was resisted. The formal drawings were made with such facility that it was felt the time could be more profitably employed in actual practical work. The boys doing these drawings had acquired skill and speed in making and in understanding such drawings during their Handwork (Paper and Cardboard Work) lessons in school. For the past five years woodwork articles have been made :

(i) with articles as patterns,
(ii) from the teacher's rough sketches,
(iii) from the boys' own sketches,
(iv) from working drawings in papers (e.g. *The Woodworker*),
(v) from the boys' adaptations of (iv).

A striking feature is that whereas the work done by the boys in the A group reaches a quite good standard of craftsmanship, the early work of the C group is far more crude than that of normal boys starting Woodwork. Looking at the early efforts of any C group boy, one wonders how he will ever reach the standard of even the poorest A group boy. Early progress is slow.

Elder brighter boys in A group carry out skilled repairs to furniture—tables, forms, and chairs—in the dining-room and classrooms as required.

The Woodwork Scheme is given later.

4. Observations

(*a*) Not all dull children will acquire such mastery of technique that Woodwork may have for them a high educational value. All the boys in the A group at this school have I.Q.s of between 66 and 75. Below I.Q. 66 or so the degree of success does not appear to warrant the use of this medium of learning.

(*b*) A striking feature of this work at Lankhills is the honesty in self-criticism. If one admires an article which represents much good work, the boy responsible will sometimes say, " There's something wrong with it ", and will point out a fault. Boys who have done a very good piece of work like to keep it and touch it and look at it for a few days.

(*c*) The principle of individual work—of boys working through the scheme at their own rate—is of course possible for classes of twenty normal boys, and is the practice in many schools. Class methods in Woodwork are difficult with boys of any intellectual level because the rates of work of the quickest and slowest boys are so different. If class-work is done, an average rate has to be taken. The quickest waste time ; the slowest never achieve anything.

5. Tracing General Principles

(*a*) Each exercise introduces a new isolate which is studied and brought into the environment of knowledge. In other words, each exercise entails practice to acquire a new skill,

which is then added to skills already acquired. The number of skills progressively increases.

(*b*) Work in this subject entails grasping relationships in concrete situations : relationships in the sketches (to get good proportion) ; relationship of sketch to object ; relationship of parts of joints to one another. The suitability of a joint for a particular purpose is a relationship.

WOODWORK SCHEME

Notes

(*a*) Models are arranged in a number of stages, which are in order of difficulty. Variety as well as progress is ensured. When a boy has made a satisfactory model at one stage he may proceed to the next, and choose, with the help of the teacher, a model from that. Boys will work through the scheme at their own individual rates.
(*b*) The list of models is merely suggestive, and is *not* comprehensive.
(*c*) In addition to the set course, minor repairs will be carried out by the more advanced boys.
(*d*) Marking out will be done by the boys themselves. This should always be checked before work is begun.
(*e*) Scale drawings or rough sketches should be made before work is started, and all measurements marked thereon. Detailed sketches of joints will be made as needed.
(*f*) *Finish.* Some models should be finished to meet requirements (to get experience of the type of finish), *e.g.* shaving-cabinet, toothbrush-rack, painted or enamelled ; cupboards, book-racks, etc., made from deal, painted, or stained, or varnished ; better models made from oak, wax-polished.
(*g*) Sharpening can be done by more advanced boys : grindstone, oilstone, setting and sharpening saw.
(*h*) *Metalwork.* This can be combined with Woodwork for more advanced boys, *e.g.* small T hinges ; angle brackets ; trays for hall-stands, etc.

Step — Preparation for All Models

(*a*) Making sketches or scale drawings (or working from a finished model).
(*b*) Measuring and sawing from plank.
(*c*) Planing face side.
(*d*) Planing face edge.
(*e*) Planing for width
(*f*) Planing for thickness } Setting gauge.
(*g*) Marking out (use square).

List of Models

Stage (1). *Half-lapped Joint*

garden label
seed protector — plant-stand

Stage (2a). Housing Joint

ink-stand	wall brackets (more skilful boys use bow saw)
egg-stand	

Stage (2b). Stopped Housing Joint

book-rack (table type)	letter-rack
book-rack (wall type)	bookshelves
pipe-rack	

Stage (3). Tongue and Groove Joint

boxes	tray
knife-box	soap-box

Stage (4). Mortice and Tenon Joint

dibber—pegged	clothes-horse—double-wedged
stools—mitre tenon	tables—haunched tenons
stools—fox-wedged	fire-screen—stopped tenons
stools—wedged tenons	

Stage (5a). Dovetail Joint

boxes	trays
knife-box	

Stage (5b). Stopped Dovetail Joint

drawers

Stage (6). Mitre Joint

trays, with inlay	mirror
picture frames	

Stage (7). Combined Joints

chest of drawers—housing, tongue and groove, dovetails
small cabinet—housing, tongue and groove, haunched tenons
shaving cabinet—housing, tongue and groove, mitre for mirror
bookstand with drawers and doors—housing, tongue and groove, grooving
table lamp—mortice and tenon, boring
mirror—mortice and tenon, mitre, rebating

Stage (8). Free Choice

Stage (9). Repairs—windows, tables, etc.

Stage (10). Locks—fitting, repairs

Theory

(10 minutes or so, and incidental as need arises)

(1) *Timber*—knowledge of timber, hardwood and soft, suitable for different jobs
(2) *Buying Timber*—stock sizes
(3) *Seasoning*
(4) *Joints*—strength and appearance
(5) *Tools*—saws, types and purpose, points per inch, length, etc.
(6) *Fixing*—nails, screws, glue, wedges, pins, etc.
(7) *Finishing*—glass paper, paint, stain, varnish, polish, etc.

Chapter IX

NEEDLEWORK

1. Development of Scheme

Some years ago a thoughtful teacher attending a Short Course in Sussex at which some of the work done by the children at Lankhills was exhibited, expressed her appreciation of the educational value of the exercises in paper and cardboard worked by the boys, and asked if this kind of work interested the girls too. When she was informed that this form of Handwork had been discontinued for girls because of the small measure of progress made (see Chapter VII, Paper and Cardboard Work, 1 (*b*)), she said that she wished it were possible to have the same learning processes embodied in a scheme of work in a medium interesting to girls.

It had already been observed that the boys were showing greater ability than the girls in tackling new jobs of work ; in thinking and planning. Our curricula for boys and girls respectively were contrasted, and while they differed because of different needs, they were comparable except in one particular. The girls had no activity parallel with the measured work in paper and cardboard done by the boys. They had not quite the same opportunities for exercising their " problem-solving apparatus ".

Because of this, and stimulated by the observation of our Sussex colleague, we sought a form of activity that would interest the girls. We thought the activity should afford opportunities to plan, to compare, and to contrast, and that it should be constructive rather than manipulative. The search took place just at the time that we had observed the " pattern of learning " underlying the learning of new Country Dances (see Chapter XII, Country Dancing, 6 (*b*)). An activity was therefore sought in which exercises could be planned in stages with a new isolate introduced at each stage. Lastly, the medium sought had to be one that would appeal to girls.

Needlework appeared the obvious choice. But when we

looked at the existing Needlework Scheme—which was largely sewing—and when we observed the low standard of the work done by these defective girls, we thought that Needlework did not offer a very promising field for experiment. Exercises in pattern-making—quite independent of the existing Needlework Scheme (which was continued concurrently)—were begun. To work these exercises in pattern-making, girls had to plan and to measure. Newspaper was used at first so that errors and spoiling would not matter. With free independent work, initial errors were to be expected. A series of exercises in pattern-making was gradually evolved by applying the principles we were seeking to follow. At times it was difficult to see what the next stage would be.

At the end of twelve months it was found possible to make the pattern-making the basis of a new Needlework Scheme. In drafting the scheme, needlework was regarded not primarily as *sewing*, not primarily as *craftwork*, but as a *means of education*—as a channel which would afford opportunities for intellectual activity. It is interesting to note that with this approach, standards of craftwork have been attained by these girls which are far higher than we had thought possible. We believe this is because there has been that exercise of intellect to acquire " real knowledge and real skills " which is so frequently referred to in the reports of the Advisory Committee.

It will be noted that in the scheme set out in this chapter the steps are at first very small. Bright children will either pass on quickly, or even omit the earliest steps.

It is not suggested that the ultimate goal has been reached. There is room for much further development. The application of Art to Needlework is one direction in which further development appears possible.

2. Notes on Scheme

" Needlework as a craft has immense educational possibilities, on account of both its constructive and its decorative qualities " (Handbook of Suggestions, 1937). This has been kept in mind in the development of the scheme in Needlework. The constructive and decorative aspects of the subject are introduced side by side and are developed independently.

Simple decorative stitchery is the first stitchery used by the girls. They experiment with it, combining various stitches, and work out their simple designs in colours they themselves choose.

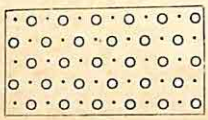
As they progress in the construction of their patterns, finer stitchery is introduced, and the decorative stitchery is used for ornamentation. Girls who are incapable of fine stitchery proceed through the pattern-making scheme, continuing to use the decorative stitchery in the construction of their garments. Later, when machining is introduced, it is found that some of these girls who are not capable of fine sewing are able to do as well as those who sew well, because they have equal ability in constructing and using paper patterns.

(a) *Pattern-making.*—Before beginning to draft their patterns the girls are given individual cyclostyled diagrams, showing side by side the diagrams from which the patterns are to be constructed and sketches of the finished articles. These diagrams are kept by the individual girls and form a reference book for future use. A diagram for each of the successive stages is shown in the scheme.

(b) *Materials.*—Besides understanding the construction and adaptation of garments, the girls should know something of the materials they use. They should learn the average widths of materials and the approximate price per yard. They should know approximately how much material is necessary for a given garment. This they get from discussion and from simple problems in arithmetic. When working from these Arithmetic Cards, girls use a reference book containing samples and particulars of materials, from which they obtain the information needed in answering the questions on the cards. In this book, materials of the same type are grouped together, and beside each group the chief characteristics of the material, its uses, the average width of the material, and the approximate price per yard, are stated briefly. The following is a specimen page from the reference book :

Piece of Plain Gingham	Piece of Check Gingham	Piece of Plaid Gingham	*Gingham* is a printed cotton material. Both sides are printed alike. *Uses :* frocks, blouses, curtains, pinafores, etc. *Width :* from 24″ to 38″. *Price per yard :* 9d. to 1s. 3d.

An example of this type of Arithmetic Card is :



Find the cost of this material per yard.

For a 16-year-old girl :
a frock needs $3\frac{1}{4}$ yards,
an overall with sleeves needs $3\frac{3}{4}$ yards,
a pinafore needs $1\frac{1}{4}$ yds.

1. How much print will be needed for a frock and a pinafore ? What will it cost ?
2. How much will be needed for two overalls ? What will they cost ?

Girls should know which materials are best suited for different garments, and the reasons for their suitability. An example of a laundry card showing one of the exercises is :

1. What material would you choose if you were going to make yourself a summer frock to wear at school ?
2. Why would you choose this material ?
3. How would you launder the frock ?
4. What are some articles you would make from white calico ?
5. How would you launder articles made of white calico ?

By reading and by talks during the lesson girls learn the origin of materials and the processes through which they have

passed before being ready for use. By doing fabric printing in their Art Lessons they learn one method of applying patterns to materials. They should have opportunities of selecting their own materials. By means of advice and helpful criticism they are soon made familiar with the various types of material, and thereafter they are able to depend entirely on their own judgment when choosing materials.

(c) *Needles and Cottons.*—The needles and cottons used should be suitable to the girl who is going to use them. They should have no bearing on age, but should depend on the *capability of the girl using them.* In the early stages, tapestry needles are used; then crewel needles are introduced, and finally sewing needles. Wool and flox will be replaced by sylko, which is followed by stranded cotton and later by sewing cotton.

(d) *Stitchery.*—In the early stages, running stitch is used for all purposes—fixing hems, joining short seams, and decoration. This and variations of running stitch are followed by other easy stitches as they are required. Fine stitchery when introduced offers no difficulty other than of dexterity, as it is a repetition of stitches previously used for decorative purposes.

(e) *Processes.*—Processes are taught as they are required. Hems are used on the first rectangular shapes. Later, simple seams, counter seams, and french seams are introduced with the bag shapes. Simple neck openings and bindings are shown with the overall and petticoat. Processes are not isolated and taught, and " held in reserve ", but are introduced when and where they are required.

(f) *Sewing Machine.*—A hand machine was introduced at the time this new scheme was started. It has been successfully used by the older girls, who take to it readily and, after practice on articles with long straight seams, soon have enough control to go on to more varied work. About twenty girls (out of 32 Senior girls) use the machine in the making of garments. Of these, about twelve have learned to thread the needle and remove, wind, and replace the bobbin, and so to work independently. A treadle machine has also been introduced, and some of the girls have gained experience in using both the hand and the treadle types.

(g) *Mending.*—Mending is taught incidentally. Running stitches used for decorative purposes on early work often take

the form of a thin place darn. Herring-boning used as a decorative stitch is ready when required for a flannel patch. In this way mending is easy to learn, as an application of processes and stitches already learned. It is done only when the need arises, and so does not become a monotonous drudgery.

(h) *Knitting.*—In its early stages, when stitches are being learned, knitting is done in the Needlework Lesson. Once it has become mechanical, however, it is done as an occupation for leisure time, and is brought into school only when new terms and new stitches need explaining. The girls knit jumpers, pullovers, and baby clothes from patterns ; and also socks and gloves using four needles.

(i) *Embroidery.*—As has been stated, all the girls start embroidery with the making of their earliest garments. As their proficiency increases, the designs become more complicated and the stitches more varied. Girls make simple border designs, working out their design on a small piece of material before working on to their garments. Other designs are copied from simple charts, or obtained by using suitable transfers. The girls who have reached the stage when they use the machine for making garments naturally finish them quickly, and so are able to give more time to fancy needlework. These girls work out elaborate designs transferred on to linen, and choose their own colours. Here again the influence of Art is seen in Needlework.

(j) *Attainments :* (i) PATTERN-MAKING.—The girls work through the scheme at their own rate. They use materials, stitchery, etc., suited to their individual capabilities. About 75% of the girls reach Stage (7) of the scheme (adapting bodice patterns to make simple garments for themselves) : 50% go further, and adapt and use existing patterns.

(ii) KNITTING.—All the girls are able to do the essential stitches before they leave school, and can make simple articles. Fifty per cent of the girls are able to follow patterns if they are explained and stitches are shown. These find difficulty in visualising written directions. About a third of all girls follow printed directions and make from them jumpers, baby-clothes, gloves, etc.

3. Needlework Scheme

(a) *Educational Value.*—Needlework trains powers of observation and judgment and the senses of form, proportion, and colour. It helps to produce staying power, because not only must thought and effort be concentrated on the work in hand, but they must also be carried on throughout several lessons to produce a finished result.

Concentration and continuity are weak in the younger dull child ; therefore until the actual stitchery is less tedious the articles made must be small, so that they may be finished before interest is lost. A seam so long as to appear endless to the dull child tends to destroy interest in needlework and lessens its educational value. Each piece of work or garment should be cut out, fixed, and made up entirely by the child.

(b) *Practical Value.*—The practical side of needlework should provide scope for the child's constructive instinct. It is most essential that the children should learn not only the cutting-out and making-up of the garment, but also that the shape of the garment depends on the part of the body it has to fit.

Neatness and thrift should be taught by :

(i) comparison between ready-made and home-made garments with regard to cost, quality, and durability,
(ii) lessons in darning, patching, and repairing, and general neatness of finish, and
(iii) working out for every pattern an estimate of quantity of material required and its approximate cost.

(c) *Stitchery and Processes :*

Stage (1)

Materials : hessian, Slav crash, flox ; large-eyed needles.
Stitches : tacking, overcasting.
Processes : turning single and double hems.

Stage (2)

Materials : slightly finer materials than in Stage (1)—linen crash, cotton crash, holland ; large-eyed needles, embroidery wools, and flox.
Stitches : blanket stitch, running (with variations of running), oversewing, back stitch.
Processes : turning single and double hems and counter seams.

Stage (3)

Materials : as in Stage (2), and finer needles and stranded cotton.
Stitches : revision of stitches learned and chain stitch and fly stitch.
Processes : hems, counter seams, and french seams.

Stage (4)

Materials : gingham, casement cloth, linen, print, nainsook ; finer needles, and stranded cotton.

Stitches : hemming, herring-boning, hemstitching, and faggoting.

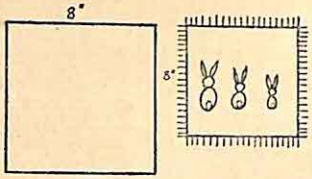
Processes : revision of those learned, and run and fell seam.

(d) *Pattern-making.*—In order to do needlework intelligently, a girl should, in addition to knowing how to do stitches and processes, be able to understand the construction of the garment she is making. She should be able to make her own patterns for simple articles that she may require, and be able to adapt and use existing patterns. To help girls to develop this power, patterns are made in paper for all types of garments from simple mats to adaptations of the bodice pattern. In making these patterns, all turnings are allowed for in the measurements given.

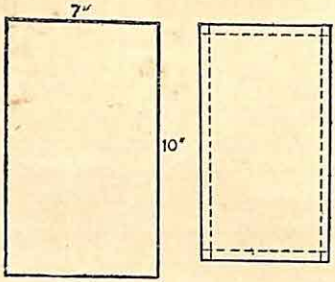
Before a girl starts to make a pattern for a garment she should if possible see the finished article, or at least a picture of it (these can be cut from catalogues), so that she can form a picture of what her own work will look like when finished. This will help her to see ahead as the work progresses.

The diagrams given to the girls to work from are simple, and lettering is avoided on them as it would confuse this type of child. Girls progress through the scheme at their own rate. Stitchery and processes are adapted to the capabilities of the girls : one may make a pinafore pattern, stitching it in embroidery cottons, whereas another may make a similar pattern and stitch it with fine cottons.

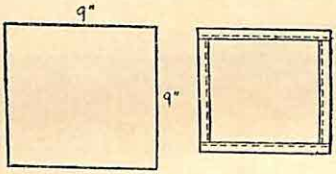
Stage (1) : At this first stage, the girls will make patterns for the little articles they are making in needlework. At first they will work in inches only, and then later half-inches will be introduced. They will make patterns for table mats, iron-holders, dolls' bed-clothes, etc. The measurements required will all be less than one foot, so that a ruler can be used. A ruler is easier to use than a tape measure at this early stage, as it is firmer to handle. The girls can have tape measures with which to measure articles about the room, so that when these are required for measuring patterns, etc., they will present no difficulty.



1. Dolly's Table Cloth



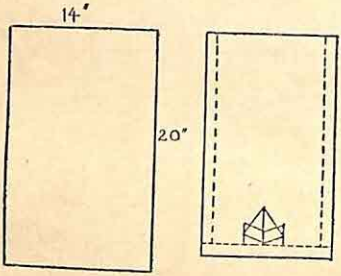
2. Doll's Sheet



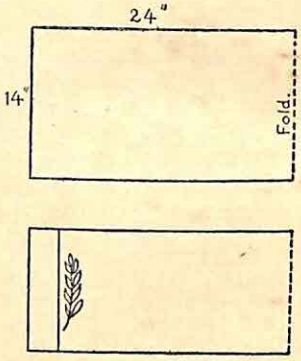
3. Iron-holder

The above are types of cards given. Girls work at their own rate.

Stage (2) : When the girls can use a tape measure and can measure in inches and half-inches, they begin to make patterns for bigger articles, chair backs, guest towels, table runners, etc. These are still flat rectangular shapes. Further exercises can be provided by making the pattern required and then doing another of the same article with half, double, or quarter the measurements given in the original exercise.

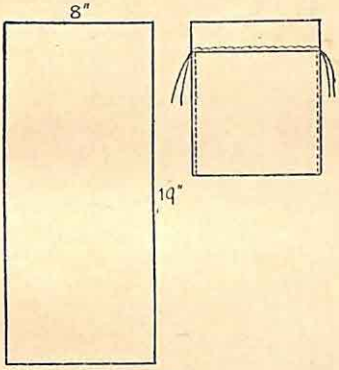


1. Chair Back

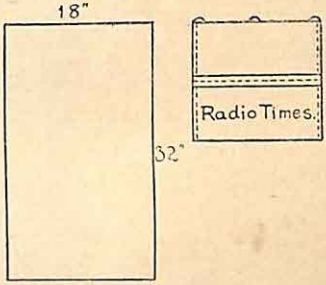


2. Table Runner

Stage (*3*) : In the previous stages the articles for which patterns have been made have been based on rectangular shapes. Now the rectangular shape is used again it will need folding into bag shapes—shoe bags, pencil-cases, comb-cases, lunch-bags, nightdress-cases, needlework and knitting bags, etc.

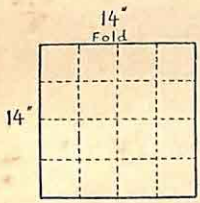


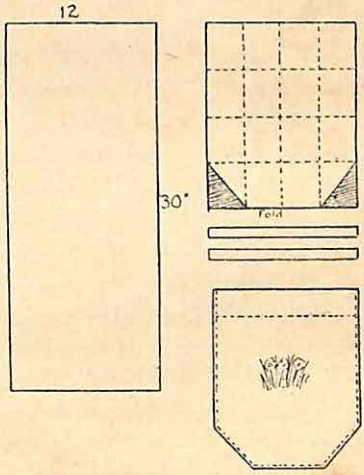
1. Bag

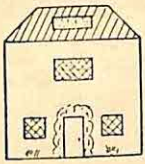


2. *Radio Times* Cover

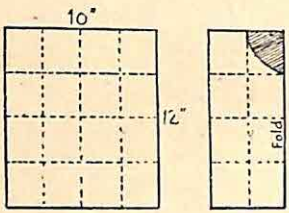
Stage (*4*) : The following patterns mark an advance on the bag shapes already made, as they require further calculations before the pattern is evolved.



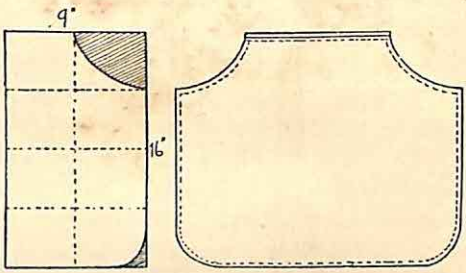




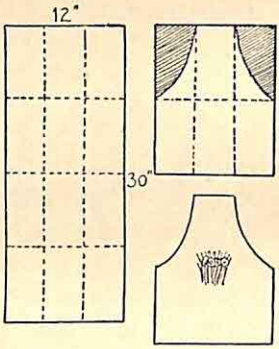
Stage (5) : Simple articles with one or two easy curves can be introduced here (bibs, pinafores, aprons, etc.). These can be done in full size and then with half original measurements.



1. Baby's Bib



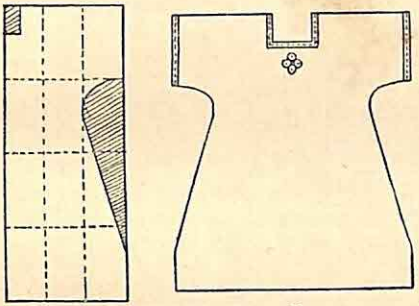
2. Knitting Bag



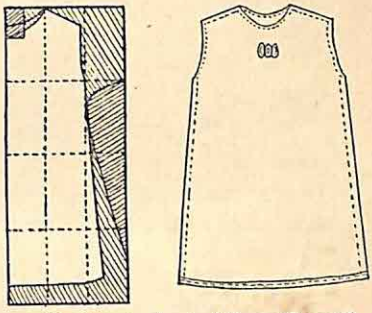
3. Knitting Bag

Stage (6) : When girls can measure and draw simple line and curve diagrams easily, they begin to make clothes. At first they will make an overall for a smaller girl. They will themselves find the required measurements. When they have made their pattern, they will fold a large sheet of newspaper as they would material, place their pattern on the newspaper, and cut out an overall. They will probably make several mistakes in cutting, but the medium is cheap and they will learn from their mistakes. When they have had practice in cutting out overalls they can use this as a foundation pattern, and make patterns for other articles—tunics, rompers, petti-

coats, etc. Each pattern as it is completed will be drawn to some simple scale in a needlework note-book. This book will be kept throughout the school, and can always be used as a reference book. In this section a paper pattern for pilch knickers will also be given. This can be used with the overall or tunic to make a set of clothing.



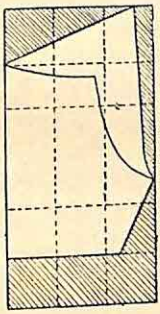
1. Child's Overall



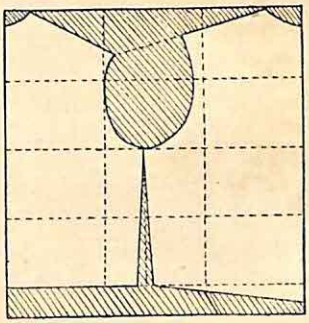
2. Petticoat adapted from Overall

Details are not written down verbally (as words would convey very little to these children) but instead they are impressed by a particularly clear marking on the diagram the children use.

Stage (7) : By this time the girls will be able to make patterns for their smaller sisters and will understand how to adjust them to individuals. Now they can adapt more complicated patterns based on the bodice pattern. They will have taken one another's measurements for aprons, etc., and so will be used to taking measurements. Now they can work in pairs, and from given directions make a bodice pattern for each other.



1. Knicker Pattern



2. Bodice Pattern

When the girls have worked through this scheme, they will have a good practical knowledge of pattern-making. They will be able to apply the knowledge they have, by using existing paper patterns intelligently. Paper patterns for simple frocks, pinafores, blouses, etc., will be bought, and the girls allowed to work from these, making the necessary adjustments.

The diagrams for bodice, overall, and knicker patterns used in this scheme are taken from *Needlework for Junior and Senior Schools*, by Gertrude Fearnside.

When girls have reached Stage (6), and so have had practice in measuring, cutting out, and fixing together various articles, they are from time to time given exercises to apply the knowledge they have acquired. For instance, a girl is given a picture (cut from a catalogue) of a maid's afternoon apron, and told to make one like it for herself. Various types of aprons, chair backs, runners, cushion covers, etc., are made in this way. The girl sees a picture of what she is to make, notes the special features of the particular article—width of hems, position of gathers, etc.—and then cuts out a paper pattern to the required size.

Later, when the scheme has been completed, garments are made to given instructions, *e.g.* "Make a bib with rounded corners for a small baby. Bind the edge in a contrasting colour."

These exercises are intended to be used only for simple articles for which it would be impossible to buy paper patterns, and where the construction of the pattern is simple enough to ensure that a good one can be made. For dresses and underwear that are of a more complicated kind, paper patterns are bought, and the girls then adapt these to their own particular needs.

4. Mending Scheme

The approach to mending is made through the ordinary needlework lesson. Plenty of practice will be given in the stitches to be used, in the form of decorative stitching on various articles, before any attempt is made to start the children on formal mending.

SEQUENCE OF WORK

(i) Sewing on buttons : after practice, buttons will be sewn on actual garments—coats, frocks, aprons, etc.

(ii) Sewing on fasteners—as for buttons.

(iii) Sewing of tapes, name tabs, loops : after practice, actual garments used—various articles of clothing, tea cloths, aprons, etc.

(iv) Darning a thin place ; darning stitch practised first by working patterns on coarse canvas in brightly coloured wools. Later on loosely woven materials, then on stocking web, and lastly on actual garments —stockings, jerseys, knickers, etc.

(v) Darning a hole—first on stocking web in bright colours, then on actual garments.

(vi) Patching :
   1. Flannel Patch : after practice, work on actual garments of woolly materials.
   2. Calico Patch : here again actual garments are used, girls' own pinafores, blouses, bodices, etc.

(vii) Repairs to household articles :
   1. Darning a patch in a table cloth.
   2. Darning a three-cornered tear.
   3. Adapting knowledge of mending to meet any particular need.

Chapter X

THE DOMESTIC SUBJECTS : HOUSEWIFERY, COOKERY, AND LAUNDRYWORK

1. General

(a) *War Conditions.*—This chapter was written in memorandum form before the outbreak of war. The war has imposed fresh conditions. The rationing of meat, the high price of fish, and the seasonal shortage of fruit, have made it necessary to use in the Cookery Lessons such materials as are available. Supplies have made possible some cakes, pastries, batters, scones, and biscuits. In the winter and early spring many vegetables were available. A variety of dishes was possible by cooking a vegetable in three or four different ways. A good exercise in one lesson for an individual girl was the preparation of potatoes in three or even four different ways. The conservative cooking of vegetables in a casserole, the preparation of savoury vegetable stews, the best use of tiny portions or even scraps of meat or fish in preparing dishes that are really attractive to eye, nose, and palate, have afforded scope for exercising their " problem-solving apparatus " to both the teacher and the girls. When onions were not available, leeks or chives were used for flavouring. Then, as the season advanced and fewer kinds of vegetables were available, salads were prepared. In Britain there is a narrow conception of the word salad. We have not yet generally realised, as our American friends have, that a green salad with a base of shredded fresh cabbage is much more pleasing than one with a lettuce base. Shredded carrot, shredded swede, and of course watercress (which in Hampshire is excellent in quality and plentiful), were other materials available. Lentils boiled and made into a purée flavoured with a little carrot, leek and salt, and a soupçon of curry powder, make a savoury dish of special value in times when first-class proteins are rare. Milk, of course, is available : and is there a limit to the dishes that can be prepared with milk ? These notes are just an indication of possibilities under the limitations imposed by new

conditions. There are of course many other interesting possibilities, of which readers themselves will know.

(b) *Justification as School Activities.*—These subjects are the traditional housecrafts. Although traditional, the methods of work (technique) have changed in a changing world. Utility of work is so obvious that not only educationists but also the general public favour the inclusion of the domestic subjects in the curriculum. Utility makes for work being purposeful, so that children's will to learn is stimulated. It is, however, possible to achieve a good-looking finished result, *e.g.* in a cookery lesson to produce an excellent cake, by means that are not sound educationally. The aim may be to make a cake, but the primary purpose is that children should *think* as well as act in order that they may acquire real knowledge and skills. Step-by-step demonstration by the teacher, followed by step-by-step practical work by the children, may result in a good cake, but will it give opportunities for children to think and to acquire real knowledge? The danger is that *result* and *purpose* may be confused.

The Domestic Subjects appear to be very good " channels through which a flow of intelligence can be induced ". They afford opportunities for the teacher to frame exercises for children that will entail planning and the eduction of relationships by the children themselves. The exercises can be so simple as to be suitable for the dullest of children. For example in Cookery the preparation of a very simple meal of two dishes, if carried out by a child herself, affords opportunities for educing relationships—sequences of operations, bearing a time relationship and a " process " relationship—in a concrete everyday situation. Such work is within the power of children so intellectually dull as to be labelled feeble-minded. At the other extreme, exercises can be framed that are so difficult as to be suitable for people of the highest intelligence and knowledge. The planning and preparation of menus for one complete meal, or for meals for a whole day, if balance and suitability are to be achieved, may need consideration of a number of more or less abstract relationships.

2. Basic Education (for Duller Children): Work at Lankhills

(a) *Special Needs.*—Many of the Lankhills girls, when they leave school, take posts in domestic service, chiefly as kitchen-maids, as housemaids, or as house-parlourmaids. For this reason there is more work in Housewifery than there would be in a Senior School. The pre-vocational aspect of training has to be kept in mind, *e.g.* certain processes need to be repeated frequently in order that speed of work may be acquired. It is found, however, that the use of methods that are sound educationally gives better results in after-school life than those given by narrow repetitive work.

(b) *Speed—Revision rather than Repetition.*—When these girls first learn new processes they are very slow indeed. With practice their rate of work increases until it is very little, if at all, inferior to that of girls of middle ability. Affording practice by constant repetition, when tried, did not result in a rapidly increasing rate of work. (This is possibly because of boredom, emotional factors not being stimulated, and because intellectual factors were not brought into activity through the facing of a problem that is partly new.) By substituting *revision*—in which the same process is practised but presented in another form—for *repetition*, interest is kept, because both the emotional and the intellectual factors are brought into play, with the result that there is rapid acceleration in the rate of work.

(c) *Limitations and Possibilities of Dull Children.*—The chief difficulty of very dull girls in after-school life is not so much their lack of skill in processes as their failure to plan sequences of processes in order to work independently. This is due to a failure to educe relationships and correlates. But the latent ability to deal with relationships and correlates *in concrete situations* of many of these dullest of all girls is equal to that of average girls. There is need, however, for training in good intellectual habits—with the aim of intellectual efficiency—if dull girls are to exercise their abilities. Exercises must therefore give opportunities for planning in sequences, and for independent thought, and the teacher's guidance must not be so close that it limits these opportunities.

(d) *General Method.*—Processes are learned singly and later combined. For example :

(i) Laundry processes are learned, with *reasons* impressed. The more advanced girls are given a whole mixed wash to sort, and told to plan their sequence of operations for laundering all the articles by the end of the day.

(ii) In Housewifery lessons, cleaning processes are learned separately and then applied to turning out rooms. Different rooms present " new environments " in which knowledge and skills must be applied.

(iii) In Cookery lessons, processes embodied in separate dishes are learned first, and then problems of preparing whole meals are presented (from very simple to more difficult combinations of dishes).

(e) *Individual Work.*—Each girl progresses through the course at her own rate. The teacher keeps individual records (for each subject a loose-leaf exercise-book, with list of class in front ; one page for each girl).

(f) *Practice and Theory.*—The teaching is on practical lines, and theory is brought in as need arises. This has been found a sound procedure in all subjects when dealing with any children of below middle ability.

(g) *Correlation with Other Subjects.*—Exercises in English and Arithmetic with a direct bearing upon the everyday problems in the Domestic Subjects class are worked in the classrooms in the periods allocated for these school subjects. The Domestic Subjects teacher and the class teachers collaborate in drafting these exercises (in the form of cards). Illustrations for the cards are obtained from *Family Meals and Catering* (coloured), and from catalogues. In this collaboration there is value to the class teacher as well as to the Domestic Subjects teacher, because this work is *purposeful*. For the Arithmetic lessons, exercises in time, weighing and measuring, costs of food, clothing and cleaning materials, etc., are drafted. (Before attending Domestic Subjects classes the girls in lower classes do practical exercises with clocks, scales and weights, and cardboard money.) In English lessons girls are required to state in writing " how to do ", or " how to make ", stating sequences and reasons. Initiative from Domestic Science teachers in general, in devising exercises on these lines for the class teacher to follow, might be helpful.

3. Cookery

All the eldest girls take this subject. They are divided into an A (better) class (generally I.Q. 66–74, M.A.s 10–11 +), and a B (poorer) class (I.Q. 66–54, M.A.s – 10).

TECHNIQUE

(*a*) Most of the girls work from cards of written instructions. The earlier ones are recipe cards. The later cards are *assignments of work* which entail using combinations of the earlier recipe cards or recipe books. The recipe cards give the ingredients and the method. Method is set out in simple language but technical terms *are* used so that at later stages the girls will be able to follow the directions given in cookery books.

(*b*) Foundation recipes are used. The knowledge gained is applied to recipes which are variations of the foundation. For example, the first lesson on batters is the making of a Yorkshire pudding. In later lessons the batter is made into pancakes or used for toad-in-the-hole or for fruit in batter. The repetition necessary for the acquisition of skill and knowledge is thus possible without monotony. (This is the " revision " mentioned earlier.)

(*c*) Manipulative skill is acquired in a similar way. In pastry-making at first the dough is made and used with no rolling and little shaping ; later it is rolled to the required shape and used for pasties, tarts, and pie-covers. Creaming is embodied in queen cakes and revised in the making of a great variety of cake and pudding mixtures.

(*d*) The better 50% of Lankhills girls (the A class mentioned earlier) apply the knowledge acquired in the earlier stages by

(i) making several dishes from one foundation,
(ii) preparing whole meals (first a simple meal, a tea ; then a breakfast, a supper of two courses, and a dinner).

These more advanced girls are given each an assignment card several days before the cookery lesson. These cards necessitate reference to recipe cards and/or recipe books.

The girls plan individually and independently in their notebooks, well before the cookery lesson, the sequence of operations they will carry out in the lesson. They work out times. Those who are going to use ovens with thermostatic control are so instructed, and they look out the setting. At present this planning on paper takes an average time of about an hour.

(*e*) One or two of the most advanced brightest girls choose a meal themselves from a book such as *The Doctor's Cookery Book*.

(*f*) Scheme Content : the A class girls do not work through the whole of Section I (*i.e.* of preparation of single dishes) before they combine dishes. After a very few lessons they prepare in one session two or more dishes to make a very simple meal,—so that *from an early stage they have to plan sequences of operations in relationship to one another.*

(*g*) Examples of Cards.

Section I : Recipe Cards

FRUIT CAKE

8 oz. flour
3 oz. margarine
4 oz. castor sugar
4 oz. currants
2 eggs
A little milk

1. Grease and line a cake tin.
2. Rub fat into flour.
3. Add currants and sugar.
4. Beat the eggs and stir in gradually.
5. Add milk if wanted.
6. Turn into a tin.
7. Bake for 1½ hr. with Mainstat at E.

BROWN STEW

½ lb. mutton
1 onion
1 carrot
Salt and pepper
1 oz. dripping
1 oz. flour
½ pt. water or stock

1. Prepare vegetables and cut into dice. Cut meat into small pieces.
2. Fry meat in dripping. Remove from pan.
3. Fry onion until brown. Add flour and brown.
4. Add water and stir until boiling.
5. Add meat and vegetables, pepper and salt.
6. Simmer for 1½–2 hr.

VICTORIA SANDWICH

4 oz. flour, self-raising
4 oz. sugar
4 oz. margarine
2 eggs
Milk if wanted

1. Light oven.
2. Grease tins and line with paper.
3. Cream the margarine and sugar together.
4. Beat in eggs.
5. Add flour slowly.
6. Add milk if mixture is too stiff.
7. Place in tins.
8. Bake in fairly hot oven for 15–20 min.
9. Turn on to a wire tray to cool.
10. Spread jam on one round and place the other on top. Sprinkle with castor sugar.
11. Put on a round plate with a d'oyley.

QUEEN OF PUDDINGS

1½ oz. breadcrumbs
1 egg
½ pint milk
1 oz. sugar

1. Grease pie-dish.
2. Make breadcrumbs.
3. Separate white from yolk of egg.
4. Warm milk and sugar.
5. Add to yolk of egg.
6. Add to breadcrumbs and leave to soak.
7. Pour into pie-dish.
8. Bake in warm oven for 20–30 min. until set.
9. Spread with jam.
10. Beat up white of egg. Place on the pudding.
11. Bake in a very cool oven until crisp.

Section II : Whole Meals

(i) A tea :

TEA

1. Plan a tea for 2 people, giving them sandwiches and two kinds of cake.
2. Give quantities.
3. What will you do first, and why?
4. What will you do next?
5. How long do the cakes take to cook?

(ii) A breakfast :

BREAKFAST

1. Plan a breakfast for 2 people. Serve toast and coffee.
2. Give quantities needed.
3. What will you do first, and why?
4. What will you do next?

(iii) A supper :

SUPPER

Menu : Macaroni cheese
Orange jelly

1. Give the quantities needed for 2 people.
2. What will you do first, and why ?
3. What will you do next ?

(Orange jelly from Nelson's *Edinburgh Book of Plain Cookery*, macaroni cheese from Recipe Card.)

(iv) A dinner :

DINNER

Menu : Liver and bacon
Carrots
Potatoes
Fruit pie, custard

1. Give quantities for 3 people.
2. What will you do first, and why ?
3. What will you do next ?
4. How long will each take to cook ?
5. To which letter will you set the Mainstat for the fruit pie ?

CUSTARD

½ oz. custard powder
½ oz. sugar, ½ pt. milk

1. Mix powder with a little of the milk to make a smooth paste.
2. Boil the rest of the milk.
3. Pour on to paste, stirring well.
4. Pour back into saucepan and add sugar.
5. Boil for 3 min., stirring all the time.

LIVER AND BACON

½ lb. liver, 4 rashers of bacon
1 oz. flour, pepper and salt
½ pint water

1. Wipe liver and cut into slices. Cut rind from bacon.
2. Mix flour, salt, and pepper together and dip the slices of bacon in it.
3. Fry bacon on both sides till crisp. Put on a hot dish and keep hot.
4. Make fat smoking hot and fry liver on both sides.
5. Arrange on dish with bacon.
6. Stir the rest of the flour into fat and brown.
7. Add water and stir till boiling.
8. Pour gravy round liver and bacon.

FRUIT PIE

4 oz. plain flour, 1 oz. lard
1 oz. margarine, cold water to mix
Fruit to fill dish, sugar

1. Make pastry.
2. Prepare fruit, add sugar and a little water.
3. Roll pastry out larger than the size of pie-dish.
4. Cut off strip for edging.
5. Damp edge of pie-dish. Put on strip and damp.
6. Cover with pastry. Trim edges.
7. Knock up edges with knife.
8. Bake in hot oven till pastry is brown. Put pie lower in oven until fruit is soft.

(v) Dinner necessitating use of Cookery Book :

DINNER

Beef olives (*Essex Cookery Book*)
Potatoes
Cornflour mould and jam sauce (*Doctor's Cookery Book*)

1. Give quantities for 4 people.
2. What will you do first, and why?
3. What will you do next?
4. How long will each take to cook? What time will each be put to cook to be ready by 4 o'clock?

(*h*) Books used :

By Children :

The Essex Cookery Book, by Margaret Hussey (Essex Education Committee)
The Doctor's Cookery Book (British Medical Association)
The Complete Guide to Home Cooking, by Susan Croft (Van den berghs and Jurgens)
The Edinburgh Book of Plain Cookery Recipes (Nelson)
Radiation Recipe Books (Radiation Ltd., 164-172 Queen Victoria Street London, E.C.4)

By Teacher :

Those used by children, and *Cooking Craft*

CONTENT OF SCHEME

Section I

(All elder girls, A and B classes, work through this individually. Not all the B girls cover the whole scheme.)

(i) Preparation and cooking of vegetables : (*a*) root, (*b*) green.
(ii) Milk puddings.
(iii) Cake-making : (*a*) rubbing in, *e.g.* rock cakes, (*b*) creaming, *e.g.* queen cakes, (*c*) melting, *e.g.* gingerbread.
(iv) Pastry : short crust and suet.
(v) Batters : plain and fritter.
(vi) Fish cookery : use of coatings, deep fat-frying.
(vii) Meat cookery : use of cheaper cuts ; economical methods—stewing and casserole cookery. Use of more expensive cuts.
(viii) Egg and cheese cookery. Necessity for careful cooking.
(ix) Use of scraps : meat, fish, potato, and bread. Making attractive, tasty, and nourishing dishes from left-overs.
(x) Beverages : tea, coffee, cocoa.

SECTION II

(Better 50% of elder girls, *i.e.* Class A only.)

Preparation of whole meals.
Planning menus, giving quantities and costs.
Planning time-table of work.
Choice of foods and foodstuffs.
Simple food values.

FACILITIES

(*a*) The school is residential. The school kitchen is allocated to the Domestic Subjects teacher from 2 P.M. to 4.30 P.M. on one afternoon, and from 2.30 P.M. to 4.30 P.M. on another afternoon per week. (A class one session of 2½ hours, B class one session of 2 hours, per week.) The Cookery class has its own separate utensils.

(*b*) The kitchen is fitted with four gas cookers. Thermostatic controls have recently been fitted to two of the ovens so that girls may gain experience of ovens both with and without these controls. An electric cooker has been provided as well for the Domestic Subjects class. There is no anthracite (Aga or Esse) cooker, and no coal range.

(*c*) Materials for cookery are provided by the L.E.A. Educational progress is thus not cramped or limited by lack of materials. Dishes or meals are prepared usually for two to four people. A girl who prepares a dish or meal eats some of it herself—as a reward or punishment! The remainder of the food prepared is eaten at a meal by the other children, who choose and criticise.

ATTAINMENTS

Nearly all the A class girls (the better 50% I.Q. 66–74) can plan and prepare independently a simple dinner by the time they leave school.

4. Housewifery

CONTENT OF SCHEME

(All elder girls : A, B, and C.)

(*a*) Washing up.
(*b*) Sweeping and dusting.
(*c*) Scrubbing : (*a*) stone and concrete, (*b*) white wood.

(*d*) Cleaning of baths and basins ; care of chromium.
(*e*) Care and cleaning of metals, *e.g.* brass and silver.
(*f*) Care and cleaning of floors and floor coverings.
(*g*) Laying and lighting a fire.
(*h*) Care and cleaning of household and toilet brushes.
(*i*) Cleaning of varnished and painted surfaces.
(*j*) Cleaning of glass.
(*k*) Laying tables.
(*l*) Turning out rooms.

The making of beds and shoe-cleaning are not included in the scheme as girls learn these in the normal routine of a residential school.

TECHNIQUE

(*a*) Processes are learned separately.

(*b*) After girls have learned several processes they are given tasks that entail a combination of them. The tasks are set out on cards, so that the sequence of processes is learned. (It is found that in Housewifery the sequences cannot at first be educed by the girls themselves.) The girls thus work from written instructions. Later a girl is given the task of combining the processes to turn out a room.

(*c*) *Examples of Cards.*—(These are given only at first. Later the girls work without instructions.)

WASHROOM

Collect :

Broom	Dustpan and brush
Duster	Cleaning paste
Netcloth	Tea towel
Bucket	Scrubbing brush
Soap	Floorcloth
Vim	Soda, Kneeler

1. Sweep and collect dust. Put away broom, dustpan, and brush.
2. Dust and rub up mirrors.
3. Clean bowls and rub up taps.
4. Scrub gullies with Vim and strong soda water.
5. Scrub floor.
6. *Wash or clean everything used and put back in correct place.*

DAYROOM

Collect :

Broom	Dustpan and brush
Duster	Kneeler
Hearthstone	Bowl
Netcloth	Polish
Cloth	Polisher

1. Take out small tables and chairs.
2. Sweep and collect dust. Put away broom, dustpan, and brush.
3. Clean hearth.
4. Dust.
5. Polish floor.
6. Put tables and chairs in place.
7. Leave room tidy.
8. *Clean everything used and put back in correct place.*

FACILITIES

(*a*) The Domestic Subjects teacher arranges with the matron for certain work to be left by the domestic staff and for certain rooms each week not to be cleaned but to be left for the girls in her class. The girls' dayroom, bootroom, ablution room, bathroom, and entrance hall, and the staff dining-room and sitting-room, are left as required.

(*b*) The pre-vocational aspect, because many of the girls after they leave school become kitchen-maids, has been borne in mind. Each Domestic Subjects class is engaged in the mornings for thirty-five minutes in washing up crockery and preparing vegetables. The younger girls in the C section (C girls are younger ; A and B classes are parallel and composed of older girls) are at first very slow at this work. Nearly all of the A and B (elder) girls work quickly : most at the same rate as well-trained girls of middle ability.

ATTAINMENTS

The techniques of work processes are learned thoroughly. In using a new process these dull girls are at first much slower than girls of middle ability. It is found best, however, not to keep a girl repeating the same process over and over again in order to acquire speed, but to let her move forward and learn other processes. The repetition necessary to enable dull girls to acquire speed can be obtained in a more interesting way by giving exercises combining processes. For example scrubbing entails repetition of sweeping and dusting.

Although work is slow at first, it is done in the proper way and thoroughly. Speed comes gradually.

About two-thirds of all the girls who leave the school are able to plan sufficiently to turn out rooms without supervision, competently, and reasonably quickly.

5. Laundrywork

CONTENT OF SCHEME

(*a*) Washing and finishing woollens ; treatment of delicate fabrics.
(*b*) Coarse cloths ; laundering strong fabrics.
(*c*) Washing and finishing white cottons : boiling and blueing ; damping, ironing, and folding.
(*d*) Coloured cottons ; starch-making. Ironing starched articles.

(*e*) Table linen ; simple methods of stain removal.
(*f*) Silk and artificial silk ; wash as woollens ; response to different temperatures in ironing.

The nature of different fabrics is shown by simple experiment : *e.g.* effects of incorrect laundering of woollen and artificial-silk articles, (*a*) rubbing, (*b*) boiling, (*c*) boiling with soda, (*d*) ironing with hot iron.

TECHNIQUE

Processes are learned separately. When the processing of two kinds of fabric is known, exercises combining both are given. Later, children are given a mixed wash to sort, to plan sequence of work, to wash, and finish in a day.

FACILITIES

(*a*) There is a laundry classroom fitted with an ironing stove, a gas copper, and a wringer. Both ordinary flat-irons and electric irons are used.

(*b*) The Domestic Subjects teacher arranges for the head laundress to hand over to her articles of clothing and house and table linen required for her class. The teaching staff supply articles of silk and artificial silk for the class to launder.

ATTAINMENT

The craftsmanship in laundrywork reaches a good standard in both quality and speed, as high as that of some A class girls in Senior Schools. Again, work is slow at first. All the A class girls (better 50% of elder girls) reach the stage of being able to deal with a mixed wash independently.

The eldest girls (A and B classes) have each two whole days in Domestic Subjects. One whole day is spent doing Laundrywork or Housewifery (half class at each), and one half-day at Housewifery, and one half-day at Cookery (plus the necessary kitchen work).

6. The Superstructure (for Brighter Children)

(*a*) The individual method—by which a girl progresses as quickly as possible—is sound too for brighter girls, for those in B and A streams in Senior Schools. It is possible to use it with classes of twenty or so, provided that there are certain material

facilities. Throughout the country the individual method is, of course, used in some classes. A teacher wishing to change from a class method to an individual method will probably find that the easiest way is to use a transitional stage of working in small groups, or of giving two or three of the most advanced girls individual assignments of work.

(*b*) Important points in using individual methods are :

(i) Preparation by the teacher of a whole series of cards. These are assignments of work. *In such a method children must work (especially in cookery lessons) from written instructions.*

(ii) The keeping of individual records. A loose-leaf exercise-book for each class is useful for this. On the front page appears a list of the names of the girls in the class with the index number of the page on which each girl's record appears.

(*c*) It is obvious that if girls are to derive full educational benefit from these subjects they must work exercises that stimulate thought and entail planning. Senior School girls in A and B classes have much greater power of educing relationships and correlates in *abstract* situations than have the girls we have been considering. The meals planned by A class girls can be more complex, and something can be learned of food values and balance in planning meals. Books as sources of information can be used more readily. For A Class girls in Senior Schools, provided that there are facilities all three subjects can be combined in one day. Exercises (written instructions on cards) may be given the girls a week ahead, so that they can plan their work beforehand on paper. The ideal appears to be to enable girls to run a small house or flat. The following is the type of card for an A class girl shown by one school at the Exhibition of English Education, at Oxford, a few years ago :

> On Friday morning you are going to cook a dinner for two people. On Friday afternoon you have two friends coming to tea. During the day you will launder an afternoon tea-cloth and serviettes and make two kinds of cakes for tea. Tea is to be completely ready by 4 P.M. The dining-room will of course be turned out in the morning. Before Friday, look up recipe books, plan the meals, and plan all the work in the order in which you will do it. Come prepared on Friday to do this.

(*d*) Some difficulties encountered by Domestic Science teachers :

(i) For a competent teacher desirous of using individual methods, numbers do not offer an insuperable difficulty if the class does not exceed 20 girls.

(ii) In Cookery lessons educational value is often not the primary consideration. Parents are sometimes expected to supply the materials or the wherewithal to buy them. The materials used in the advanced stages are somewhat beyond the means of the poorer parents. Parents expect to see a result—a well-cooked dish. Where such close guidance has to be given that there is never any spoiling of material, there is little educational value in the exercises. It is difficult for parents to appreciate that the best teacher is one who leaves some freedom of thought—freedom to plan, and sometimes to make mistakes. It is especially difficult for very poor parents to realise that the purpose of the work is primarily *educational*—to acquire skills and knowledge—and that real skills and knowledge cannot be acquired unless there is independent thought and work, and occasionally apparent failure in result. L.E.A.s spend comparatively large sums of money on Domestic Subjects teachers' salaries and on equipment. For a tiny percentage of this expenditure spent on materials for the Cookery classes the return in the way of educational efficiency would be incredibly higher. Some of the dishes cooked would be purchased by the children and by the school staff, so that the net expenditure on raw materials would really be very little. Failure to provide adequate materials for cookery lessons is comparable to fitting smaller propellers on the *Queen Mary* because big propellers are more expensive !

(iii) Even in rooms that are regarded as well-equipped Domestic Subjects rooms, there are often inadequate facilities for *sufficient* practical work for a whole class of 20 girls. Particularly is this so with C classes, who must do chiefly practical work for the reason that most theory, except such as arises from practice, is beyond them.

Twenty girls trained to work efficiently and quickly (as

they should be trained) can do an *enormous* amount of efficient housework in one half-day. Even one flat or one small house appears to offer insufficient opportunities for a whole class of 20 girls.

(iv) In some schools, cookery is still taught by the teacher demonstrating and the girls copying, often a step-by-step process. In some, insufficient equipment or insufficient opportunities for practical work result in much oral teaching being given. The Domestic Subjects offer splendid opportunities for real education, for thinking, for planning and carrying out sequences of operations, for acquiring real knowledge and real skills by "applying" and by "doing".

(v) The Domestic Subjects teacher is sometimes isolated from the rest of the staff of a school. The Domestic Subjects are sometimes isolated from the rest of the curriculum. The D.S. teacher's own enthusiasm, interest in children (as well as in the subject), and initiative can do much in overcoming the difficulties. There are head teachers who can be convinced that the Domestic Subjects offer the most valuable channel in the whole curriculum for the education of girls. There are class teacher colleagues who can arrive at a view that English and Arithmetic correlated with the Domestic Subjects can become more purposeful.

Chapter XI

ART

1. General Observations

(*a*) The word "teaching" associated with "Art" would to-day arouse much indignation among those teachers who maintain that modern art is free expression. In 1938 at an exhibition of work in Art where all the exhibits were "free expressional" work, the following points were noted :

(i) there appeared to be little if any difference between the work of the Junior School group and the work of the Teachers' Training College group ;
(ii) all the work showed crude drawing—representations of objects appeared to be badly out of proportion and out of perspective ;
(iii) the colours generally were either hideously bright or muddy ;
(iv) the pamphlet explaining the work deprecated any teaching of technique, yet the *frames* in which the work was exhibited were beautiful examples of woodwork technique!

(*b*) "Free expressional" work of this type appears to be due to revulsion, a swing of the pendulum away from the formalism of the Art teaching of a few years ago. Most older teachers will remember the deadly dull model, freehand, and perspective drawing of the past. The break away from it, the effort to give freedom, has in some cases resulted in no guidance at all being given to children. The temptation to follow this method is great for the teacher who knows little about Art. Yet the ultimate test of soundness of method must be an educational one. Can these same methods be used in other subjects ? Would it be educationally sound to let a child with no knowledge of music sit at a piano and "express" himself? He would be unable to do so because he had no technique.

Educational method appears to pass through phases. Woodwork and English are both in a third phase.

Phase I : Technique all-important.
In Woodwork, joints *as such* were made.
In English, grammar was given great prominence.
At this stage, work lacked purpose and interest for children, and there was no " expressional " work.

Phase II : Technique was almost entirely neglected, and purpose and interest were all-important.
In Woodwork this was the " hammer and nails " period.
In English, no grammar at all was taught, and " free expression " was the slogan.

Phase III : Some technique is taught but the teaching is not laboured. Interest and purpose are kept in mind.
Opportunities are given for expressional work, for using and applying the technique.
In Woodwork, joints are made again, but not merely as joints. They are embodied in *articles*.
In English, some grammar is taught, but again not as an end, but as a means to an end. The end is correct free verbal expression (oral and written).

Art, as advocated by the extremists in free expression, appears to have reached the second phase of this development.

Children must have freedom to express their ideas, but they must learn to use their tools correctly and to plan their work to obtain the best and (to them) the most satisfying results with the minimum expenditure of effort and time. Our view, then, is that Art work in a third phase, in which both technique and freedom of expression have a place, will be on sound educational lines.

Dr. P. B. Ballard [1] (following an exposition of the methods advocated by Miss Marion Richardson) states :

> The artist has long ago definitely discarded the theory that the function of art is to reproduce nature ; that the aim of the artist should be to represent, as faithfully as his skill and his materials will permit, the appearance of objects in the material world. The camera has given a death blow to that theory. Not that it was ever seriously held by the discerning. In the East it had never gained a foothold ; and even in Europe it had only found lodgment in the minds of the populace and of painters who could not paint. It is now realised that the artist may interpret nature, or may reveal the spirit of nature, or may use nature as his raw material,

[1] *Educating for Democracy*, ed. Cohen and Travers (Macmillan).

but he must not merely mirror nature. Verisimilitude is not art. So much is everywhere conceded.

But he adds :

> It is a matter of common knowledge that a young child begins to lose his spontaneous joy in drawing about the age of 9 or 10. Becoming critical of his own efforts, he tends to lose heart. He feels the need for a better technique ; and that is precisely the time to give it him.

Dr. Ballard's view leads us to the thought that many teachers of Art may now have passed on to a third phase.

We are indebted to Mr. E. E. Pullee, Principal of the Portsmouth School of Art, for much of the following. Mr. Pullee has made a close study of children's drawings and has attended European conferences of teachers of Art. He has recorded in a memorandum the results of years of observation and discussion.

Many authorities on children's drawing are now of opinion that children while young should have a period of spontaneous free drawing, but that on reaching a certain age teaching should be introduced, gradually at first, then proceeding to a stage of methodical teaching. Many stress the delicacy of the transitional stage, pointing out the danger of passing straight away from the childish conception to that of adults, since the two are radically opposed to each other.

An analysis put forward by one authority and supported in the main by others is :

(i) An initial phase (3 to 8 years) characterised by *naïveté* and persistent awkwardness. A period of spontaneous free drawing.

(ii) A transitional phase (8 to 12 years) marked by more sustained visual attention. The child takes note of certain illusions of perspective. It is during this period that the teacher should try to eliminate as far as graphic language is concerned persistent *automatic* faults.

(iii) Final phase (above 12 years of age). Period of improvement. Teaching carried on with method and perseverance.

Most of our readers will know that the " opposition of a childish conception to that of adults ", referred to above, lies chiefly in the fact that a child draws what he knows is there

an adult what he sees. The child in this is guided by his intellect and not by his vision. For example, a young child drawing a head in profile shows two eyes, and he draws furniture and people behind the thickest walls, and fish in the depths of a lake. Those who are specialist teachers of Art know that the characteristics of children's drawings may be explained by certain inherent laws in a child's mode of vision, and that these laws have been classified.

The scheme given in this chapter was drafted by the specialist teacher in Art at Lankhills a few years ago, after observing for a period the special limitations and possibilities of these particular children. It is interesting to note that introduction to object and flower drawing is deferred until children are 12 years of age or older, and in the case of children newly admitted at that age, until they have been in the school six months or longer.

This is because it had been found that the younger children at Lankhills lacked the power of sustained visual attention.

2. Our Scheme

(*a*) Art Appreciation is not mentioned specifically in the Scheme because it is generally incidental. Children observe colour schemes used in certain shop-window dressings. They see good prints of pictures and pottery in other shop windows. Subjects for pictures are seen in the surrounding countryside during walks. This is a residential school, and teachers take children out for walks and sometimes direct attention to these points.

All this, as well as being purposeful observation, is incidental but necessary training in appreciation.

(*b*) *Colour and its Use.*—The children use water-colour boxes with the eight Ostwald colours, and learn to choose colours from the Ostwald colour circles. It is found that the rule for choosing colour can most easily be given in design work.

The three rules for colour which these children use are as follows :

(i) Contrasting colours are colours that are opposite to each other.

(ii) Harmonising colours are adjacent colours coming within a right angle in the colour circle.
(iii) When contrasting colours are chosen, and together with them is used a tint of one of those colours, the tint is called the Discordant Colour.

The children use contrasting colours throughout Stage (1) of their design work. The colours are given them for their first design, and thereafter they choose from the colour circle.

Colour harmony is introduced at Stage (2), when the all-over spot designs are made.

In the early stages only the circle of pure hues is used. The colour circles of tints and shades, and grey, white, black, and brown, are used by the older children when they are ready. This may be at any age from 12 to 16 years. Some of the older children learn to use discordant colours, but they must first be able to reason out the amount of colour that should be used in design, as the discordant colour may be used only in very small quantity.

It has been found that children do apply the rules of colour to their picture-making, for the use of good colour becomes a habit. Only on rare occasions is colour chosen wrongly. As the children get older they criticise colour schemes, and anything incorrect is at once noticed. Advice from the teacher on the choice of tints and shades is frequently requested by older children.

(*c*) *Scope of the Scheme* (set out in detail in the scheme) :

(i) Design and its Application
(ii) Picture Composition
(iii) Object and Plant Drawing
} generally in water colour.

The first two are introduced from the time a child is admitted (ages of admission roughly 9–12 years, average age on admission about 11 years) and run concurrently. Object and plant drawing are not introduced until a child reaches 12 years of age or over and has been in the school six months or more.

(i) *Design.*—The stages by which this is learned are set out in detail and illustrated in the Art scheme (*q.v.*). The aim is to make children realise that a design is a repeating unit and that it can be used for decoration. At first the children's

designs are confined to straight-line geometric shapes and at this stage they may not introduce curves. (This is contrary to the general practice in most schools, where designs of flowing curved type are attempted from the beginning. We believe that this formal step-by-step training is sound for these intellectually dull children, and the ultimate results appear to support this belief.) There are endless possibilities in straight-lined shapes, and the children never appear to be at a loss for ideas for original designs. Later, when the notion of "rhythms" of design is obviously grasped, the children are advised to introduce curves. Usually these children are 13 years old by the time they reach this stage. Eventually freehand designs are made. The children by this time know *how* to place their units. They have learned many types of placing—in repeating, dropping, and alternating designs: that is, they have acquired a technique. Children apply their designs to materials or paper, using potato and lino-blocks, with speed and accuracy.

(ii) *Picture-making.*—Without training children of this low intellectual level do not know what a picture is. When first they come to this school, they are given the opportunity of making a picture, as a test, in order that the extent of their training and grasp of the fundamentals of drawing and colour appreciation may be assessed. It is found that many children at the end of an hour still have a blank sheet of paper—and in some cases they are children 12 years of age! If there is anything on the paper, in many cases it is an oblong in the middle to represent a house, with perhaps a door and two windows, with no roof, but with a stream of smoke at the top of the house. A dirty blue streak across the top of the page stands for the sky, a streak of green at the bottom the grass, and the house is red. That appears to be infant work at the level of the child's mental age, but in Art work, children of this low intellectual level if trained correctly can approach closely in attainment normal children of their own actual ages. In the picture-making scheme at first much work is copied, so that ideas for pictures may be acquired. Later these children make original pictures. Execution approaches fairly closely that of normal children. Ideas for pictures are, however, never so plentiful among dull as among normal children.

(iii) *Object and Plant Drawing* (*Water Colour*).—We are aware that in some Art circles the drawing of objects and plants is frowned upon. It is retained in the scheme at this school on account of the training it affords in careful observation for children who are not naturally observant. Examination of a series of drawings by any one child reveals that in each successive drawing increasingly careful powers of observation are shown.

The children at Lankhills begin this work at an age when they can concentrate for long periods. Newly admitted children of 12 and 13 years of age take from six to twelve months to acquire habits of concentration, and so are not permitted for a while to take up this form of art. In a term of, say, 14 lessons, each child spends only two or three lessons at object or plant drawing.

Objects for drawing are carefully chosen so that they make immediate appeal to the children. Children learn first to get a general impression of the object. They make a rough sketch of this on paper. A more careful outline of the whole group is then made, and finally a more detailed drawing. About ten times as long is spent in actual observation as is required for the actual drawing.

3. Attainments

Attainments of the Lankhills children in some of the work in Art—in work in original design and in object and flower drawing—reach a high standard. The most striking feature is the high all-round level of attainment among the whole group of unselected elder children (*i.e.* of all in the Senior classes, which form two-thirds of all the children in the school). The many visitors to Lankhills who have been competent to express an opinion have stated that in the oldest A classes in Senior Schools there are a few children (" half a dozen or so " has been mentioned several times) who do work of a higher standard in these branches. Our view is that successful work in original design and in object and flower drawing depends largely on gF abilities—on a grasp of visual relationships—and in these abilities Lankhills children are, on the average, not inferior to children in the day schools. Moreover the gF methods used generally in education at Lankhills tend to train

the children's powers of observation (powers of sustained visual attention).

In Picture Composition the work of Lankhills children is definitely much inferior to that of children of middle ability. To make pictures imagination is required.

It will be observed that in a term at this school, for two-thirds of the children (all elder ones) there are usually only 14 Art lessons. The scope of the work is wide—pictures, design, applied design (fabric printing, etc.), object and plant drawing. A feature is the large amount of work the children do in a given time.

4. Looking Ahead

(*a*) The possibilities are being explored of raising the standard of work in picture-making done by these children. Small groups of selected children have been taken to work out of doors for special observation, discussion, and drawing.

(*b*) In all sound education, subjects at later stages tend to merge. For example, is survey work geography or mathematics?

This tendency has been observed elsewhere in the branches of Art work where object drawing is applied to design, and design and picture-making are combined. Experiments in merging the three branches are being carried out.

(*c*) Some application of design to needlework is already made. Further possibilities of applying Art more generally to Needlework, and Needlework to Art, are being explored.

(*d*) Some of the modern techniques to obtain effects that are pleasing and emotionally satisfying—*e.g.* various types of stippling for backgrounds—are being tried out. Tableaux with figures made in paper in the round—and using various media—are another innovation.

5. Scheme of Work in Art

We have tried to set this out in such a way that teachers without special gifts and special training in the subject can use it. We suggest that the scheme is suitable for children of any intellectual level.

INTRODUCTORY NOTES

The scheme is divided into three parts : Design, Pictorial Composition, and Object Drawing.

Junior Classes do the first two parts of the scheme, reaching in some cases the later stages of the Picture-Making scheme, and in all cases the stage of the All-Over Repeating Design. They also learn the simple rules of colour contrast and harmony, which enables them to choose colours independently.

Senior children do all three branches of Art, and those who show a talent in any one direction spend most of their time developing their special gift.

In a term of about fourteen lessons, a minimum of two, and a maximum of four, lessons are usually given to Object Drawing.

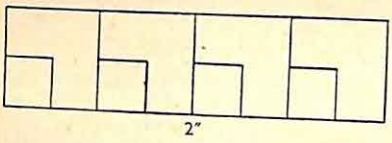
The lowest grade children do not attempt original pictures, and spend much time doing simple original design work.

DESIGN

Stage (1) : Border Designs

(*a*) The children copy two border designs, done in contrasting colours. In this they learn the principle underlying most design, of repeating a shape, or unit.

1.



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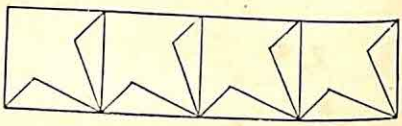
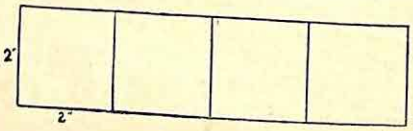
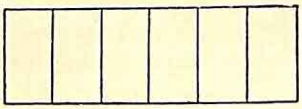


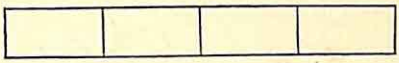
(*b*) A border of 2″ squares is shown. The children draw this, and make their own design in this border. They need to be told to keep their design to one corner or side of the square, otherwise they tend to draw the diagonals, or put a pattern in each corner, which at once spoils the unity of the design. Contrasting colours are chosen from the colour circle.



(*c*) A border of 2″ × 1″ upright rectangles is planned.

Designs to fill this are sketched on rough paper, and the teacher chooses the best, to be done in the border. A design to fill a border of rectangles in a horizontal position is similarly chosen and drawn. Contrasting colours are used.

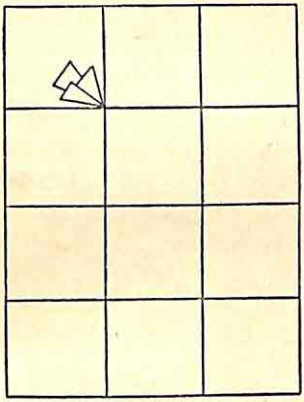
1. 

2. 

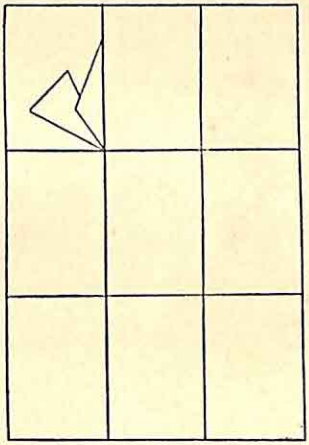
Stage (2) : All-over Spot Designs

(*a*) For the first spot design an area of 6″ × 8″ is drawn and divided into 2″ squares. On rough paper designs are sketched, with the pattern confined to one corner of the square. One is chosen to be repeated over the whole area. Colour harmony is introduced for this design.

(*b*) A design is similarly executed for an area of 6″ × 9″, divided into rectangles of 2″ × 3″.



(*a*)



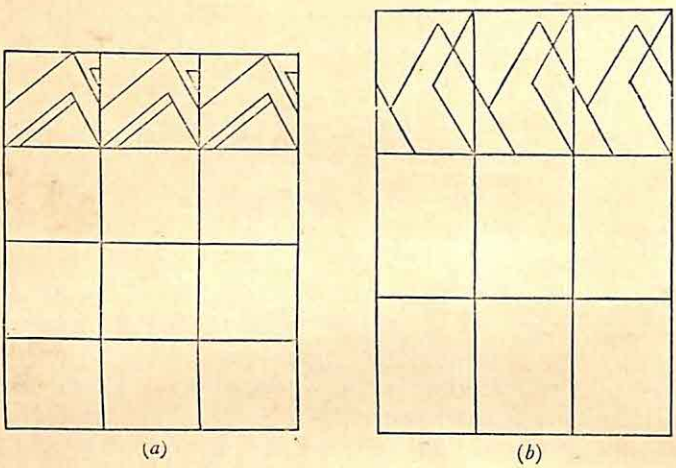
(*b*)

Stage (3) : All-over Repeating Designs

In all designs of this type the design may flow from one square or rectangle into the next. The pattern usually fills the area in which it is drawn.

(*a*) The design is drawn in 2″ or 3″ squares.

(*b*) The design is drawn in rectangles of $2'' \times 3''$ over an area $6'' \times 9''$.

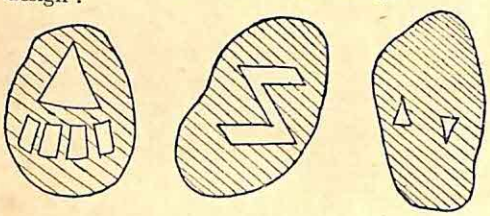


(*a*) (*b*)

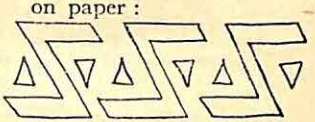
Special Note

At this stage in design work it is possible to apply design to large areas of paper, suitable for bookbinding, using the potato cut for printing. The potato is cut carefully in half, so that a flat surface is obtained. Parts of the surface are then cut away so as to leave a pattern, which can be printed in one colour on paper. For design requiring more than one colour, a separate block is needed for each colour. (The shaded parts are cut away.)

(*a*) One-colour design : (*b*) Two-colour design :



Simple repeat of (*b*) design on paper :



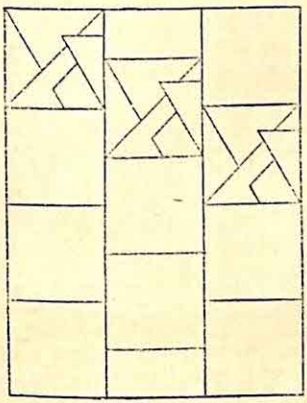
The colour used for potato printing is powder colour.

When printing on smooth paper, it may be necessary to add a little Gloy to the paint to thicken it.

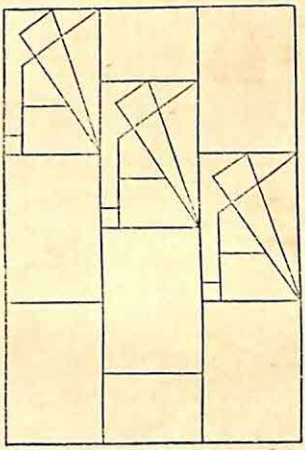
(*c*) In this design the square is dropped half-way down in

each repeat. The drop frequently means that a good design is far more pleasing, and often the addition of an extra line gives greater unity to the pattern than can be achieved in an ordinary repeat.

(*d*) The design is repeated in a manner similar to the previous one.



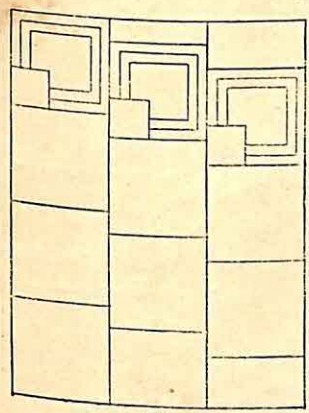
(*c*)



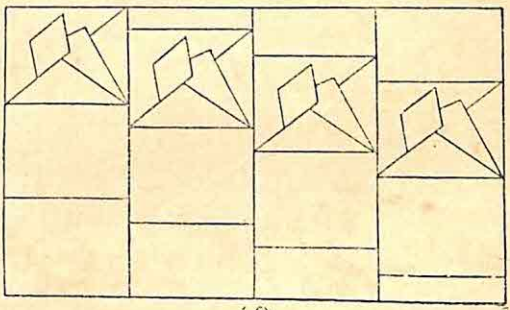
(*d*)

(*e*) The square is dropped quarter of its distance down in each repeat in this pattern. A greater degree of accuracy is necessary in drawing and tracing.

(*f*) The rectangle with the quarter drop may be placed either way, according to the type of design used.



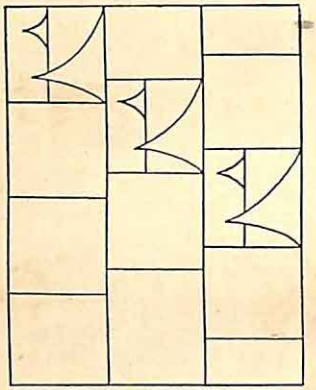
(*e*)



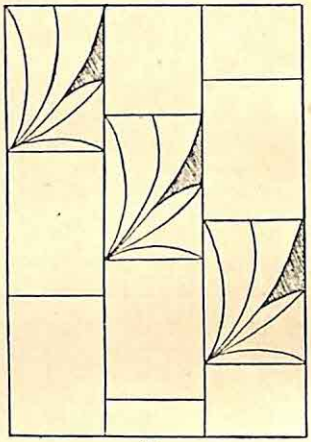
(*f*)

(*g*) Squares are now dropped three-quarters of the distance down the preceding square.

(*h*) Rectangles have a similar three-quarter drop.

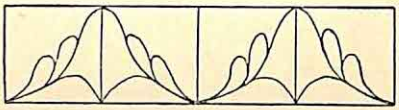


(*g*)



(*h*)

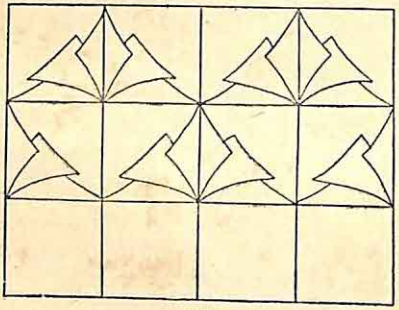
(*i*) Border designs have reversed units.



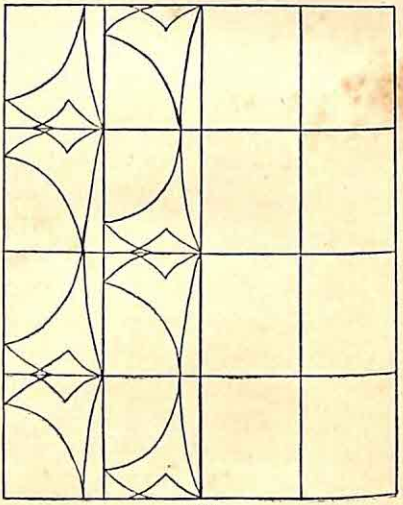
(*i*)

(*j*) Squares or rectangles in an all-over repeating pattern, with reversed units and alternate repeats.

(*k*) Squares or rectangles with inverted units and alternating repeats.

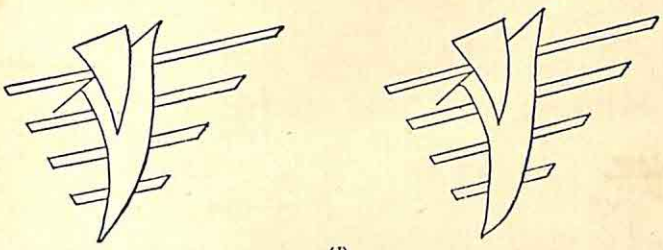


(*j*)



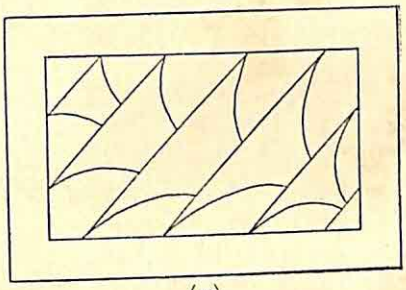
(*k*)

(*l*) Designs for repeating are sketched freely, to be repeated in any way desired.



(*l*)

(*m*) All-over designs without repeat. These are more difficult to do, and often lack unity. This is the type required for rugs, stools, cushion covers, etc.



(*m*)

(*n*) Fabric-printing.

FABRIC-PRINTING

When the elements of design have been learned, and the children can draw and colour their designs accurately and pleasantly, it is time to introduce fabric-printing. This is purposely left as the last stage in design work, as cutting and preparing blocks is a process requiring skills and speed of work, and the actual application of the design on the fabric must be very rapid in order to justify the place of fabric-printing in the Art Syllabus.

Cutting the Block.—The printing process is a development of the potato print, except that the design, as it will appear when finished, must be accurately drawn on paper, and coloured,

before the blocks are started. A separate tracing of each colour is then made on a piece of lino. The design is cut and the block shaped, leaving key points for fitting the different colours when printing. The blocks are nailed on to wood (3-ply, 5-ply, or ½" soft wood will do), which is the same shape as the lino.

Flocking the Block.—In order to make the surface of the block slightly absorbent, to hold the fabric dye, the block must be flocked. A preparation of glue, called mordaunt, is applied thinly and evenly to the block with a rubber roller. Then fine French flock (powdered wool) is sifted on to the block until a perfectly even layer covers the design. The sides of the block are held vertically between the thumb and forefinger, and the bottom of the block is tapped on the table to shake off any excess of flock. The blocks are then left for forty-eight hours to dry.

Printing.—If the tube dye is used, the colour is rolled evenly on to a piece of glass, and the roller is then rolled carefully over the block. If the colours overlap at all it will be necessary to postpone printing with the second colour until the first is dry.

If liquid dye is used, the colour will be poured on to a felt pad large enough to take the block, and the block need only be pressed on this and then on the fabric.

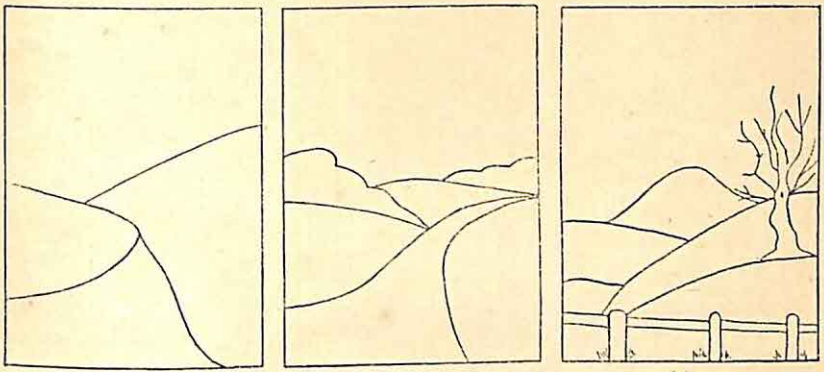
Although the primary purpose of fabric-printing consists in the educational exercises it affords, some very pleasing results, using one, two, three, and four colours, have been obtained.

PICTORIAL COMPOSITION

Stage (*1*)

(*a*) Copied picture, very simple, coloured. The children draw the picture on a fairly large sheet of paper pinned on to a sloping board. They then learn how to apply their colour, which must be very wet and must flow evenly down the paper. A right-handed child applies colour horizontally from left to right.

(*b*) Copied picture, more advanced, coloured. This requires more careful observation, has a little more detail, and there are more colours to apply.

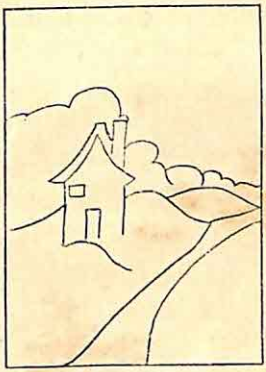


(*a*) (*b*) (*c*)

(*c*) Copied picture, advanced, coloured. Further interest is added by the fence and the tree. Observation has to be still more careful.

Stage (*2*)

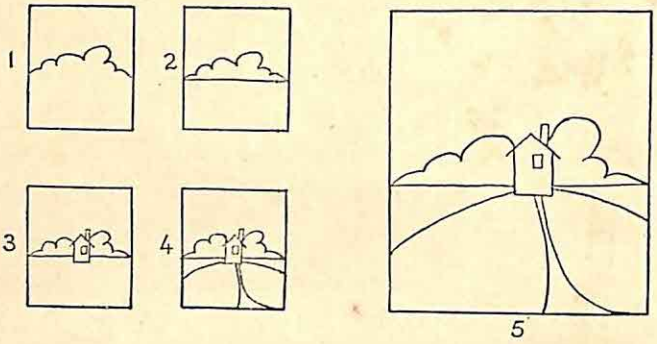
Copied pictures, black and white. The children still copy, but they may choose their own colours for this.



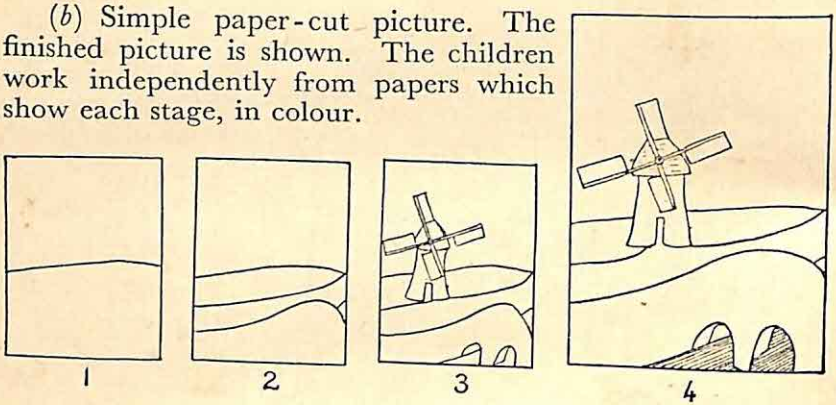
Stage (*3*) : *Paper-cut Pictures*

In paper-cut pictures all papers are coloured by the children.

(*a*) Simple paper-cut picture. The finished picture is shown. The teacher works through each stage of the construction with the group of children.



(*b*) Simple paper-cut picture. The finished picture is shown. The children work independently from papers which show each stage, in colour.



(*c*) Paper-cut, finished picture. The stages for this are sketched in white chalk on the board.

(*d*) Paper-cut built up from a coloured picture : intermediate stages must be planned by the children.

(*e*) Paper-cut built up from black and white drawing. The colouring, as well as the planning, must be individual at this stage.

Stage (*4*)

(*a*) Original pictures : things seen.

(*b*) Pictures about known subjects, " An Airport ", " Ships in Dock ".

(*c*) Illustrations of nursery rhymes, stories, and poetry.

Original pictures are done with dull children only after the first stages of picture-making are completed. Certain children of the lowest grades never do original pictures after one or two attempts, because they have no ideas for them at all.

All suggested subjects are of concrete things, mostly things of everyday experience. At the stage of picture-making children receive individual coaching as the need arises. Appreciation of good prints in books, pictures, or postcards is valuable for suggesting new technique, ways and types of colouring, and design.

OBJECT DRAWING

Every object drawn is chosen carefully with regard to colour, shape, and appeal to the children drawing it. No formal perspective work is included in the scheme.

The objects are set up on hinged drawing boards, the one for the background being covered with pale tinted paper, and the one for the foreground being covered with paper of a darker colour. All drawings are coloured. Children generally start object drawing when they are twelve years old.

Stage (*1*) *:* A single toy, stuffed and brightly coloured (a Woolworth 6d. rabbit, in blue or orange, with a white front and ear linings, is ideal ; other similar types of toys, suitable for this purpose, may be purchased there). The background will contrast with the rabbit. Drawings must be bold, and colour applied very wet on a sloping surface.

Stage (*2*) *:* A single toy, with a little more detail (*e.g.* a golliwog, or rag Dutch doll). The colour is still applied as in a

flat wash. No shading or colour-merging is attempted in these early stages.

Stage (*3*) *:* Toys of the mechanical or hard-surfaced type, still with little detail, and bold colour. Ships, motor-cars, and mail vans are good.

Stage (*4*) *:* A group of toys, perhaps a toy with a ball, or skipping rope, or a bucket and spade, can be drawn. In arranging the group care should be taken to ensure that from all views the toys appear to overlap each other a little. Otherwise the arrangement is bad, and finished groups will appear to lack unity.

Stage (*5*) *:* Dull-surfaced but pleasant-coloured objects, perhaps pottery. *One* object will have for additional interest a necklace of bright-coloured beads, or a book of bright, but one-coloured, binding, perhaps a few cherries, or any similar article that will add colour to the main object without detracting from its interest.

Stage (*6*) *:* The introduction of glass requires colour-merging. A wine-bottle with fruit makes a pleasant group. There are many types of wine-bottles that can be used. Coloured grape-fruit glasses are also pleasing. Children at this stage will generally notice shadows and high lights. If they do not, these can be pointed out to them.

Stage (*7*) *:* Metal. This is the most advanced stage, as the reflections on metal objects require careful and quick colour-merging. Some technique in merging must be acquired before the last groups are attempted. Fairly bold objects of brass, copper, or chromium should be used, with smaller bright objects to make a pleasant group.

PLANT DRAWING

This will not be attempted until the children are at Stage (5) of the Object Drawing, as colour-merging is essential in Plant Drawing. The children first attempt individual plants of simple formation like the tulip, or the poppy, which have little detail. Later the larger flowers—daffodils, narcissi, and irises—may be attempted. Plants are carefully drawn in pencil and painted in pale water colour (tinted), or in full natural colours. A more advanced stage would be outlining in pen and paint the plant that has already been painted.

Chapter XII

COUNTRY DANCING

1. Introduction

For some years now Country Dancing has been for the girls at Lankhills one of their most joyous activities. All the elder girls know many dances. Most of them dance well. The dancing of the selected team is very beautiful indeed—a source of pleasure to the girls themselves and to the many people who have seen it. The poise, the movements, the vivacious facial expressions, and the atmosphere of happiness are remarkable. The speed of learning new dances is still more remarkable. Yet it was not always thus.

2. Country Dancing as a School Activity

If an attempt were made to justify the inclusion of dancing in a school curriculum it would be based generally on emotional and physical grounds. It is a joyous activity that appears to promote mental and physical health. It was on these grounds that it was started at Lankhills. It has been continued and developed not only because it is joyous and healthful, but also because of its educational value. It is a means of stimulating intellectual activity.

3. Attainments of M.D. Children

(a) *View in 1934.*—In the three years following the introduction of Country Dancing at Lankhills, very little progress was made. A number of girls knew perhaps half a dozen dances. The learning of a new dance was a slow and laborious business. The execution of the dances was vastly inferior to the execution by girls of average ability in Senior Schools. Even members of a selected team of Lankhills children were sometimes hesitant, sometimes not all moving rhythmically, and generally lacking in poise and grace. Our view at that time, arrived at after

observation of children at this school, of children in other Special (M.D.) Schools, of children in Senior Schools, and after discussion with many teachers, was that children so intellectually dull as to be labelled feeble-minded showed generally in Country Dancing considerable inferiority to children of middle ability in—

(i) poise,
(ii) rhythmic movement,
(iii) speed of learning new dances,
(iv) ability to remember and execute "movements" in proper sequence, and so to learn and *know* a large number of dances.

Further, it appeared to be agreed among teachers that C children are inferior generally in these respects to B children, and B children to A children. An *apparent* exception was observed at two M.D. Colonies where teams of young women danced as well as normal young women. (The rate of learning new work was not observed, nor was the number of dances known ascertained.) Young women in M.D. Colonies are certified under the Mental Deficiency Acts. The criterion for this certification is not intellectual, as is the certification of children under the Education Act, but social. Thus the young women inmates may be lacking not so much in intellect as in other essential qualities of mind. Lack of emotional control, expressed in anti-social behaviour, may be a determinant. Indeed, some young women in M.D. Colonies have I.Q.s ranging from 75 to 90+. These two examples are thus not necessarily contradictory to the view formed by 1934.

(b) *View in 1941.*—In the fourth year of the activity at Lankhills great progress was made. It is remarkable that many newly-introduced activities have followed a similar course. School Gardening (*q.v.*) for boys met with little success in the first two or three years, and then appeared to jump forward suddenly. Attainments in Needlework (*q.v.*) did not go beyond a fairly low level of attainment for some years, and then rose steadily.

Attainments now in Country Dancing will no longer support a view that they march with gv ability. The dancing of some of the children at Lankhills is now in all the respects (i) to (iv)

stated in the preceding paragraph, equal to that of well-taught A class Senior School girls. (There has been opportunity to compare.) There are 32 senior girls at Lankhills. The following are the present attainments of the whole unselected group stated as objectively as possible :

TEAM I : of 6 or 8 girls according to dance. These girls know 29 dances. That is to say, they can dance to music, without error or hesitation and without prompting, any of these dances. (The list of dances known by all four teams is given later in this chapter.) The dancing reaches a very high standard indeed. Bodily poise is graceful ; there are lightness of movement, perfect rhythm, and fine control of all movements, including " tidy " feet. No anxiety in recalling sequences of movements is apparent, for the girls' faces are bright and vivacious. These girls catch the spirit of the dance, and their dancing is graceful and beautiful. Their rate of learning new dances is believed to be exceptional. The learning of new work has been observed by many visiting teachers, for at each of the 15 courses for teachers, run at Lankhills over a period of three years, a Country Dance lesson has been given in which a new dance has been taught. In a half-hour's lesson a period usually of 10 to 12 minutes is devoted to new work. Althea was learned and then danced through to music without error or prompting in a total time of 9 minutes (it needed polishing later). The dance contained a new set-step, a new movement, and of course was a new sequence of movements. Hunsdon House took 12 minutes. The first part of Newcastle—a difficult dance—took 8½ minutes. (These times include the final dancing to music.) All these were taught before an audience of teachers. The speed of learning is such that on one or two earlier courses our visiting colleagues had some doubt as to the dance's being quite new and unknown. A new dance was therefore taught the following week, and opportunities were given both before and after the dance for the visiting teachers to satisfy themselves that the work was entirely new and unknown to the girls. This same precaution was taken at each subsequent course.

It is agreed that these 8 girls are *selected.* They are the best 25% of the senior girls in this school—but the selection is from girls with I.Q.s of from 54 to 74 and not one of them is of

higher intellectual level than the poorest 5 children in a C class in an average three-stream Senior School.

TEAM II : 8 to 10 girls (the balance of the 16 girls forming Teams I and II). This team knows 24 dances. The dancing of the girls in it is a little inferior to that of girls in Team I. Some will pass on to Team I as older girls leave school. The rhythm is as good as that of Team I, and the girls dance as joyously. The dances are known perfectly. Poise and grace are good, but not so beautiful as with Team I. These Second Team girls take considerably longer than the First Team to learn new dances.

TEAM III : 8 girls who know 17 dances. The dances are known perfectly. Rhythm is good. Footwork and poise are definitely inferior to those of Team II. Most of these girls are younger girls who will pass to Team II and eventually to Team I.

TEAM IV : 8 girls who know 14 dances. Until a year ago there were always 4 or 5 girls in this team who appeared to lack any sense of rhythm at all. Two years ago Rhythmics lessons were started ($\frac{1}{2}$ hour per week by a different teacher). Now only one girl appears to be lacking in rhythm and one lacks control and sometimes breaks rhythm. All remember the sequences of movements and enjoy dancing. Four are potential Team II or Team I girls.

4. Reasons for Difference in Attainment shown in (a) 1934 and (b) 1941

Most teachers who have visited, or attended courses or conference-courses at Lankhills, attribute (at first) such success as there may be in any work to superlative teaching. My colleagues are too modest and too intelligent to be satisfied with this as an explanation. They are of course gifted and industrious, but so are the great majority of teachers. During the time that the Country Dancing has been so successful and has reached and maintained such high standards (about six years) there have been four successive teachers. While undoubtedly the personal factor of the teacher is a matter of importance, it would not alone account for a standard of work that is exceptional for children of this intellectual level. The technique by

which the children learn and the form of lesson adopted are, we believe, important factors making for successful work.

5. Time Given to Subject

Each girl has one half-hour lesson per week in school time (two classes : (*a*) Teams I and II, (*b*) Teams III and IV). In addition, during the winter months one period of about ¾ hour per fortnight is given to the subject by the senior girls, as a recreational activity. It will be seen that the *time* devoted to the subject is not very long. Our experience with Country Dancing, as with Art (*q.v.*) and some other subjects, is that it is not so much a problem of time as of quality of work. Preparation by the teacher before the lesson ensures continuity of work and speed of learning.

6. Learning a New Dance

Usually only 10 to 12 minutes of a half-hour's lesson is devoted to new work. We have found it best, even if the new work is not then fully known, to pass on and leave further work with it for the next lesson, rather than to labour on.

(a) *Procedure of Learning.*—The following method is used (children with a background of some known dances) :

(i) The movement that is *new* in the dance is studied first. (It may be a combination of " movements " forming a " part ".) If it contains a new step, the teacher demonstrates it (visualised by the children) and the children practise it. If it is merely a new combination of known steps, it is dictated orally by the teacher and carried out by *all* the children in the class (without music).

(ii) A *selected team* only (of 4, 6, or 8, according to dance) then learns the whole dance. (Supervision of only one team will ensure absolute accuracy from the beginning, and is simpler than the supervision of the several teams in a class. The rest of the class observe.)

1. The first *part* of the dance is dictated orally and then danced by the children to get the sequence (relationships) of the movements (without music). If this part

is a rather difficult series of movements it is then repeated to music.

2. The second and other parts are gone through similarly.

(iii) The whole dance is then done to music (sometimes the music is pianoforte, sometimes violin, but usually a gramophone record).

(iv) In a later lesson the selected team take new partners from the rest of the class who have observed the teaching.

(b) *Analysis of Method of Learning :*

o New Isolate (new piece of knowledge or new skill to be acquired),

o–o–o–o–o–o–o Environment (existing body of knowledge or skills).

(i) The new isolate is studied first.

(ii) The new isolate is brought into its environment in a certain relationship to previously studied isolates. Usually in a new dance there is a rearrangement of known movements into a new series (fresh sequences).

This pattern of learning may appear to follow the lines of the Gestalt hypothesis. Actually it appears to us to be an application of Spearman's theory. The learning process in Country Dancing appears to be the grasp of a series of relationships. Moreover, in teaching a new movement or part, the teacher sometimes pauses to ask, " What do you think comes next ? " The answer, which is usually given readily by the girls, is obtained by their applying a known observed relationship to a portion of a movement in order to ascertain the next part of the movement. It is the eduction of a correlate.

In order to dance successfully it is necessary to think ahead of the movement actually being performed ; to grasp the relationship of one movement with the next ; to think in sequences and series. Moreover thought is stimulated not only in this way but in planning bodily movements to be made in right relationship with those of the rest of the team.

Although a group activity, Country Dancing appears to afford opportunities for much individual thought. The thought is exercised in grasping the series of visual relationships. For children new to a class, steps and movements are demonstrated and the technical terms are mentioned. Later the technical

terms become so well known that mention of them appears to conjure up immediately in the girls' minds visual images of the movements. New dances are learned by Team I chiefly from oral instructions followed by practice. Groups of visiting teachers are often amazed to observe this team grasp quickly and carry out apparently with ease lengthy oral instructions for a series of movements, instructions that we who are observing cannot grasp and remember. Undoubtedly there is quick association between word-sounds and image-comprehension. (This is unusual among poor gv children.)

We believe that this is due to interest and "will to learn" with the consequent deep concentration, together with the fact that the technique of learning in all subjects at Lankhills is based on grasping relationships chiefly of visual type and thinking in sequences and series.

7. Form of Lesson

The following are the teacher's notes of an actual lesson lasting half an hour, given before a group of teachers attending a course at Lankhills (1937). Lessons are always projected, and usually take this form. Sometimes in the period for new work, instead of a new dance being taught, certain steps and movements are revised and polished. The explanatory notes that follow the notes of the lesson were added for the benefit of the visitors, who were each given a copy.

(a) *Outline of Country Dance Lesson:*

(i) Known Dance (whole class) : Bonnets so Blue.

(ii) 1. Revision of steps and movements (whole class) : double siding, arming, set and turn single, spring.

2. Practice of new movement (whole class). This is a new isolate for the new dance, studied first.

Half poussette : Circular Ley for 8
Siding left, turn single
Siding right, turn single

(iii) Learning of new dance (selected team) : Nonesuch.

(iv) Further coaching of fairly new work (selected team) :

(*a*) The Geud Man (*b*) New Bo-Peep

(v) Finished work (selected team) :

(*a*) Hey ! Boys ! (*b*) Sellenger's Round

(vi) Practice of dances known to majority of class :

(*a*) Rufty Tufty (*b*) The Mary and Dorothy
(*c*) Haste to the Wedding

(b) *Notes on this Lesson :*

(i) *Introduction.*—The practice of a dance known to the whole class serves as an introduction to a Country Dancing lesson. (Its place may be taken by skipping and running to music when only a few children know the dance.) Interest is aroused, there is desire to learn, and children become alert physically and mentally. (Creation of " right emotional environment ".)

(ii) 1. *Revision of Steps.*—It is advisable to concentrate upon a few movements and steps at each lesson, so that a high standard of technique may be reached and maintained.

2. *Practice of New Movement.*—When a new dance is to be learned, interest is added if the whole class can rehearse the new movement or sequence of movements before a selected team learn the new dance.

(iii) *Learning of New Dance.*—This particular dance requires eight girls. It is usually inadvisable for more than this number to practise at the first time. (When one team has a fair knowledge of the dance the members can take new partners, and so help to teach the next team.)

(iv) *Further Coaching of Fairly New Work.*—These two dances have been taught within the past week, and need to be " finished ".

(v) *Finished Work.*—A selected team can show a higher standard than that of some of the rest of the class.

(vi) *Practice of Dances known to Majority of Children.*—Rufty Tufty (which is an easy dance) has also been learned during the past week. The other two dances were learned earlier. Some few children have little sense of rhythm, whilst others cannot remember the sequence of movements. It will be seen that the better dancers are needed to help these. (*Note, later :* all the girls in this A group have danced rhythmically for the past four years.) A well-known dance for all completes the lesson, so that the children leave the lesson happily, wanting to return.

(c) *Analysis of Lesson Form :*

(i) *Emotional Factors.*—It will be observed that the lesson starts and finishes with well-known dances in which the whole class can take part happily.

(ii) *Sequence of Lesson :*

1. It has been found best, by trial and error, to take the new work early in the lesson.

2. Time given to new work : out of the whole lesson of 30 minutes a period of about 8 minutes in *this* lesson was devoted to new work. Usually a period of about 10 to 12 minutes is devoted to new work, the longer time being possible by the omission of Section 5.

3. Section 5 (finished work by a selected team) is sometimes omitted from a lesson. It was included in this lesson so that visitors could see the standard of finished work of the best team. It is included sometimes when there are no visitors as a pattern for the less skilful girls.

4. Sections 4 and 6. It will be noted that the dances range from those

most recently learned to the better known ones. (This is the method of revision.)

5. The most striking feature is the vast amount of work done in the half-hour period. Only a class that has been very well taught over a period and that is keenly interested (whether they are Secondary, Senior, or Special School girls) will cover this amount of work in the time.

8. Superstructure for Brighter Children

In some other chapters in this book subjects have been considered

(i) from the aspect of their general educational value,
(ii) from the aspect of basic education, the education of these dullest children being regarded as a base on which a superstructure of education for brighter children can be built.

We have already considered (i) and seen the value of Country Dancing for providing exercises in which children must think in sequences and series and grasp relationships. There appears little to add in the way of superstructure. The methods described appear quite sound for use with any children. Good intellectual habits will be developed by their use. With brighter children, however, results will be more immediate. Brighter children will learn the first few dances much more quickly and will do them much better than these children who are intellectually very dull.

A finding that has been valuable is that it is best not to labour with a very few dances in order to improve execution, but to move on and teach new dances. A new dance revises steps and revises some known movements and interest is thus maintained. *Revision* appears better than mere *repetition.* (See also the same point in the chapters on Domestic Subjects and Woodwork.)

9. Known Dances

(*a*) The repertoire of dances changes. As new dances are learned, older ones are discontinued. The repertoire of Teams I and II has been approximately constant in number (although the dances are different) for the past three or four

years. The repertoire of Teams III and IV has increased slightly in number (four years ago both teams knew four dances fewer) but of course the dances are different.

(*b*) "Known" means that they can be danced to music without error or hesitation and without prompting.

(*c*) List of Known Dances (April 1941):

TEAM IV	(14)	Flowers of Edinburgh	Butterfly
		Galopede	We won't go Home until Morning
		Haste to the Wedding	The Black Nag
		Bonnets so Blue	Catching of Quails
		Rufty Tufty	Lady Spellor
		The Mary and Dorothy	The New Bo-Peep
		Sellenger's Round	Christchurch Bells
TEAM III	(17)	All above, and the following:	
		The Old Mole	The Geud Man
		Epping Forest	
TEAM II	(24)	All above, and the following:	
		Dargason	Newcastle
		The Spaniard	Childgrove
		Nancy's Fancy	Black Jack
		Row well, Ye Mariners	
TEAM I	(29)	All above, and the following:	
		Parson's Farewell	Bonny Bonny Broom
		Apley House	Gathering Peascods
		Picking up Sticks	

NOTES

(*a*) The following further five dances learned by Teams I and II, but not danced in the current term, could, after brief revision, be danced by these teams:

Althea — Hunsdon House
Jenny Pluck Pears — If All the World were Paper
The Maid Peeped Out

(*b*) It will be observed that Teams IV and III know the easier dances and Teams II and I more difficult ones. Newcastle (Teams I and II) is a fairly difficult dance. Parson's Farewell (Team I) is a very difficult dance.

10. Books and Records

The Country Dance Book (Instructions, Parts I to IV, and VI) is in use at this school, with Tunes, Sets 1 to 11 (The English Folk Dance and Song Society, Cecil Sharp House, 2 Regent's Park Road, London, N.W.1). Gramophone Records are Columbia or H.M.V.

11. Later Developments

(*a*) The introduction two years ago of work in Rhythmics for elder girls has been noted. One effect of the Rhythmics Lessons can be seen in the greatly improved dancing of the poorer dancers. (It must not be thought because this is stated that the real educational value of Rhythmics is not appreciated, but in this chapter our concern is primarily with Country Dancing.)

(*b*) The Junior Mixed Classes for the last year or so have had a Rhythmics lesson each week.

(*c*) The teachers of Country Dancing and of a Junior Class have both during the last winter taken Junior girls and boys for Country Dancing occasionally as an evening recreational activity.

(*d*) For the Senior boys six months ago two classes were begun, one in Country Dancing and the other in Morris and Sword Dancing. For some of the lessons in Country Dancing the class has been mixed, the competent girl dancers helping the boys. When the boys' technique has improved, all their Country Dancing will be with girls. The Sword and Morris Dancing with its strong muscular movements will be kept as a boys' activity.

Chapter XIII

PHYSICAL EDUCATION

1. General

(a) *The Teacher's View.*—The national campaign for physical fitness, with the reiteration of the slogan "Keep Fit", has resulted in some confused thinking. Propaganda intended primarily for adolescents and adults who normally take little or no physical exercise stresses physical training, chiefly in the form of physical exercise. We, as teachers, are concerned not with the narrow issue of physical training but with a much wider issue—the whole well-being of children, both physical and mental.

(b) *Nutrition First Consideration.*—It will be agreed that the basis of all education is physical, and maximum intellectual efficiency and educational attainments are not possible without physical well-being. But the physical well-being of children is dependent primarily upon nutrition. Very many children who are far removed from the state of showing clinical symptoms of malnutrition live on a diet that is below the minimum standard laid down by the British Medical Association. The B.M.A. diets of course fall far below the standard of optimum diets. To advocate, therefore, increased physical training for children without at the same time considering their nutrition may prove to be detrimental instead of beneficial.

(c) *Danger of giving Physical Training Isolated Prominence.*—The existence of a special inspectorate at the Board of Education, and of special organisers employed by Local Education Authorities, is apparently necessary, and the value of their work is not questioned. There is, however, a danger in giving Physical Training this isolated prominence. There are many "subjects" in the school curriculum, and it is well to remember that all healthy children indulge in much physical activity in out-of-school hours. Can it be said that among the children left in the Senior Schools after the skimming for Secondary Schools there is a parallel intellectual activity in out-of-school

hours? In these days of the cinema, the wireless, and of ready-made pleasures and amusements, there is possibly less stimulus for thought than formerly. The place of Physical Training in the school curriculum thus needs careful consideration.

(d) *Intellectual Values of Physical Education.*—In thinking of children's needs, the term Physical Education appears preferable to the term Physical Training. Physical values are obvious; emotional values are generally recognised; but intellectual values are not always appreciated. In each lesson in the Board's syllabus new exercises are introduced. To perform these exercises successfully, children need to learn usually a new movement (new isolate) and to carry it out in a certain relationship with other known movements, usually in a new sequence (*i.e.* a series of relationships). This is an intellectual exercise.

2. For the Dullest Educable Children

The physical education of these children is not dealt with from the aspect of *basic* education, because the possibilities of dull children are as great as those of children of the same ages in A stream classes. The children at Lankhills have a range of I.Q. 54–74, with a Mean I.Q. of 66. The content and technique of their syllabus are the same as those designed for normal children of the same age, with some modifications only for younger newly-admitted children.

All the children in this school have two P.T. lessons per week, each of half an hour. Sports and games are out-of-school activities.

3. Classes at this School—and Attainments

(a) *Junior B.*—The youngest class of children (a mixed class: Average Age, 10 yrs. 9 mths.; Age Range, 9 yrs. to 12 yrs. 5 mths.). In a term when more than half the children in this class were newly admitted it was found necessary to work during that term from the lessons in the Board's Syllabus designed for Infant Grade normal children. These lessons were used not on physical but on mental grounds (both emotional and intellectual). At first the new children were lacking in interest, in "will to learn", and consequently in attention. Group activities designed for normal children of

the same age were, however, found possible after the first few lessons.

In a second term with this class it was found possible to use Tables, but they are still those designed for younger children. New exercises are demonstrated and oral instructions are kept as few as possible and are given slowly, deliberately, and quietly. The inferiority of very dull children is most marked in their lack of verbal ability. To them, quick long instructions are torrents of meaningless sound. Children *have to listen* to a quiet voice.

WORK DONE IN A YEAR (April 1938 to March 1939, two half-hour lessons per week) : Board of Education 1933 Syllabus, Infants' Lessons 6–18, Tables 1–6. Total of 13 lessons, 6 tables.

Since these children started at a lower level, they covered more work than a group of younger children would normally cover.

LEVEL OF ATTAINMENT (March 1939) : Board of Education 1933 Syllabus, Table 6 :

(b) *Junior A.*—A mixed class of boys and girls : Average Age, 12 yrs. 1 mth. ; Age Range, 10 yrs. 9 mths. to 13 yrs. 4 mths.

No modifications of the ordinary syllabus are made for this class. Usually new exercises are demonstrated (this is sound for normals too) but sometimes the exercises are carried out from oral instructions.

The work of this class and of the classes mentioned later has been seen by many hundreds of visiting teachers. The work of this class compares favourably with that of a well-taught class of children of average ability, and of the same age, in—

(i) amount of work done in each lesson (see below),
(ii) ground covered each year (see below),
(iii) rate of learning new work,
(iv) rate of response to commands,
(v) movement—both control and rhythm,
(vi) skill in group activities and leadership of groups.

WORK DONE IN A YEAR (April 1938 to March 1939, two half-hour lessons per week) : Board of Education 1933 Syllabus, Tables 25–36 (same rate as for normal children).

LEVEL OF ATTAINMENT (March 1939) : Board of Education 1933 Syllabus, Table 36 :

(c) *Senior Girls.* This class is divided into three groups :

Group A : Average Age, 14 yrs. 10 mths. ; Age Range, 13 yrs. 11 mths. to 16 yrs. 2 mths.

Group B : Average Age, 14 yrs. 3 mths. ; Age Range, 13 yrs. 11 mths. to 15 yrs. 11 mths.

Group C : Average Age, 13 yrs. 5 mths. ; Age Range, 12 yrs. 10 mths. to 13 yrs. 11 mths.

The Board's Syllabus for Girls and Women is used. The work in every way reaches the standard of a well-taught class of normals of the same age. Apparatus is, of course, used for Group Activities (mats, mattresses, balancing forms, vaulting box, and vaulting buck). The girls are graceful in their movements, and quite fearless in the group activities.

WORK DONE IN A YEAR (April 1938 to March 1939, two half-hour lessons per week) :

All Groups : Board's 1933 Syllabus, Table 39, to Board's Syllabus for Girls and Women, Table 8 (12 tables—at same rate as for normal children). The upper limit of the work covered is, of course, that reached by the A Sub-group only. (Cf. present level of attainment.)

LEVEL OF ATTAINMENT (March 1939) :

Group A : Table 8, Girls' and Women's Syllabus.
Group B : Table 2, Girls' and Women's Syllabus.
Group C : Table 42, Board's 1933 Syllabus.

All the above classes are taken by one teacher who specialises in Physical Training and Art (no *special* P.T. training). The half-hour lesson includes five minutes for changing. With classes using the 1933 Syllabus, fifteen minutes is devoted to class work, and ten minutes to group work and game (game not always included). With classes using the Syllabus for Girls and Women, a period of twenty minutes is spent in class-work and ten minutes in group work.

For apparatus work the Senior girls are grouped according to the capabilities of individual children. Certain of the heavier

girls, as well as some timid girls, together constituting about one-quarter of the class, do no vaulting on the box or high jumps with the buck. With these, more balancing and form work is done.

(d) *Senior Boys.*—One group of thirty boys : Average Age, 14 yrs. 8 mths. ; Age Range, 13 yrs. 5 mths. to 16 yrs. 2 mths. This class has been taught in each of the past three years by two selected men students from the local Training College, who attend alternately.

Work is taken from the Board's Syllabus for Boys and Men, and from the Bradford Syllabus (Marshall).

In Class Activities the work of these boys is not quite so good as that of the Senior girls (which would be good for normals). In poise, movement, and rhythm the boys show some inferiority. The students and the many visiting head teachers of Senior Schools are, however, unanimously of opinion that this work approaches closely that of their oldest A class boys.

In Group Activities a high degree of skill and courage is shown (*e.g.* in March 1939, 29 out of the total of 30 unselected Senior boys in this class could manage—unaided—the neck roll on the vaulting box).

Later Note

The closing-down of the local Training College because of military needs had the result of there being no teacher available for this class. For two terms there was, for the Senior Boys' Class, no Physical Training as such. Morris Dancing and Country Dancing for the boys were substituted. At the end of the second term the boys themselves asked for P.T. lessons. When the difficulty of obtaining a teacher for them was explained, they asked, " Why can't Miss X take us ? " (the woman teacher taking the Physical Education with the Junior Classes and the Senior Girls' Classes) : " we've all been in her class." When my colleague was approached she gladly took on this class and her work with it has been an unqualified success. The boys are up to 16 years of age, some of them being very tall and heavy, but with careful training for the advanced apparatus work, both in the exercises themselves

and in catching, the same confidence and courage that have always characterised this work have been maintained. This note is added because of the difficulty that faces many Senior Schools through the loss of the younger men teachers who are serving with H.M. Forces.

(e) *General: All Classes.*—ATTAINMENTS: The standards are, for mentally defective children, exceptionally high. It is difficult to state this in more objective form. Where statements appear to be an expression of opinion, they are the unanimous (and unsolicited) opinions of the very many teachers who have come to this school on visits or to attend courses.

FACILITIES: There is no gymnasium, but the dining-hall, 70 feet by 23 feet, is used. Apparatus is available. Lessons are never missed, and so there is continuity. Every lesson is planned carefully beforehand by the teacher.

DIFFERENCES BETWEEN THE BOYS AND THE GIRLS AT THIS SCHOOL:

(i) Some differences between the Senior Boys' Class and the Senior Girls' Class have been stated.

(ii) In out-of-school hours the girls, with very few exceptions, are well-poised and move gracefully. In these respects the boys are inferior.

(iii) The longer holidays of the Training College have meant fewer P.T. lessons during the year for Senior boys than for Senior girls. Since the removal of the local Training College this difficulty has been overcome, as explained above.

(iv) Country Dancing has for some years been an activity for the Senior girls here. This would tend to improve poise and movement. Recently, Morris and Sword Dancing have been started with the Senior boys, and Rhythmics and Country Dancing with the younger boys and girls.

4. Sports and Games

Lankhills children have in the past been relatively very much better at athletic sports (success in which is dependent on individual effort) than at games like football, cricket, netball, and stoolball (success in which is dependent on movements made in relation to the movements of others).

ATHLETIC SPORTS

Out of one hundred children in the school at any one time, perhaps ten have some physical disability that unfits them for running and jumping. The mean general level of attainments of the remaining ninety children appears to be that of normal children in the ordinary schools. A few of the best normal children reach higher standards, but among these M.D. children there is a fairly high *general* level of attainment.

(a) *Boys*

(i) One year, out of the whole unselected group of sixteen boys aged 14–16 years,

14 boys could jump 3 ft. 6 in. or higher, and of these
9 boys could jump 3 ft. 11 in. or higher.

Yet in that year the winner of the High Jump cleared only 4 ft. $6\frac{1}{2}$ in. and the school record is only 4 ft. $8\frac{1}{2}$ in. (Note fairly high level of attainment.)

(ii) In most years, out of the whole unselected group of boys aged 12–14 years, more than 50% run the Half Mile in $3\frac{1}{4}$ minutes or less. The school record is 2 min. $39\frac{3}{5}$ sec. (Comparatively poor: but poor track, 269 yards lap, slope, etc.)

(iii) In Long Jumping a fairly high standard is reached. Jumps are measured from toe (take-off on beaten sand) to heel or last touch-down (in pit). The run for the Long Jump is slightly downhill, because of the limitations of the play-field, and results are therefore higher than they would be on level ground. These results are, however, given to show the high proportion of boys who reach a fair standard. In 1937:

in the 14–16 years group, 9 boys jumped 14 ft. or more
(Winner 18 feet, Record 18 ft. 9 in.),
in the 12–14 years group, 10 boys jumped 12 ft. or more
(Winner 14 feet 5 in., Record 16 ft. 5 in.),
in the under 12 years group, 4 boys jumped 10 feet or more
(Winner 11 feet 6 in., Record 14 feet).

There were only 48 boys in the school, of whom 23 are accounted for here.

(b) *Girls*

(i) The girls' 220 Yards records (on a bad curved track) are :

for the 14–16 years group, 31⅕ sec.
for the 12–14 years group, 33 sec.
for the Under 12 years group, 35⅕ sec.

(ii) The girls' High Jump records are :

for the 14–16 years group, 4 ft. 4½ in.
for the 12–14 years group, 4 ft. 0½ in.
for the 10–12 years group, 3 ft. 4 in.

GAMES

In stoolball (girls) and cricket (boys) these very dull children are slightly inferior to normal children of the same age. (Note small numbers from which to select teams : 48 boys, 53 girls, covering wide age range.) In netball (girls) and football (boys) they seem much inferior. Netball and football appear to need much combination of effort. Despite this, several individual boys who have left the school play football for their village or small town teams.

Later Note, 1941

In the last two cricket seasons and in the last football season the boys have played in a league against normal boys of the same age. They have won the championship cups : both seasons for cricket and in the one season for football. The striking feature about the cricket both seasons was the excellent fielding—quick action and fine covering play. This indicates quick reaction times and combination of effort (movement in relation to others), in both of which these boys have until recently seemed lacking. We cannot account for this great improvement except by assuming that the emotional stimulus of competitive play has enabled boys to overcome what we had assumed to be an innate disability.

Chapter XIV

SCHOOL GARDENING AND RURAL SCIENCE

1. For Those Not Interested

(a) *Educational Venture.*—Among the teachers who read this book will be many who are not interested in School Gardening. Most urban schools and some rural schools have no facilities for this activity, and where there are gardens, they naturally tend to become the province of the specialist teacher. Thus the proportion of teachers who are interested in this subject is probably small. This chapter, however, contains very little about school gardening from a technical point of view, but is an account of the general educational effects of its inclusion in a scheme of learning. It contains :

(i) an account of the reaction of groups of the dullest of all children to newly-introduced educational activities, not only to school gardening, but to other activities also ;

(ii) schemes of work in School Gardening and Rural Science planned for groups of children of three different intellectual levels (they are schemes that have been used successfully with children graded by their gv abilities) ;

(iii) an outline of some classroom experimental work in Rural Science with examples of the type of exercises set for the children to work. These examples indicate methods. Even if no gardens are available, work on these lines may be possible. Moreover the methods are applicable to work in sciences other than rural science.

(b) *Course of Development.*—Since School Gardening was first introduced at Lankhills sixteen years ago, the course of development has been as indicated below.

(i) For two years there appeared to be complete failure. The boys seemed to have acquired neither knowledge nor skills. So profound was the failure, that the attempt to use this activity as a means of education was almost abandoned.

(ii) In the third year there was a sudden advance, and by the end of the third year the boys were working skilfully and independently.

(iii) Over the many years since that time, this activity has continued with but little teaching effort. There have been a few further small developments, but from the fourth year onwards a consistently high degree of skill has been shown by the successive groups of boys engaged in this work.

(c) *Points arising from this :*

(i) We have observed that most activities newly introduced at Lankhills have followed a similar course of development —Country Dancing (*q.v.*), Physical Training, Handwork (measured work in Paper and Cardboard), Domestic Subjects, Woodwork. Even English, although it was not strictly speaking a newly-introduced activity, followed this course when a new conception of it was introduced.

(ii) The explanation of this curious phenomenon, of prolonged failure with poor attainment preceding a quick success, is unknown to us. The lines of thought that we have followed in the search for an explanation will be given. None, however, appears to lead to a satisfactory conclusion.

(iii) Perhaps the most important point is that the need for courage and persistence on the part of the teacher becomes clear. In the face of apparent failure, even after prolonged effort, it is necessary to refuse to accept defeat. We must examine from time to time the curriculum content and the technique with a view to seeing that exercises are at the right level. We must keep in mind too that the exercising of the child's " problem-solving apparatus " is more important than his achieving immediate apparently good results ; that success cannot be measured by immediate attainment. Ultimate attainment is, however, necessary for that emotional satisfaction which will stimulate further effort.

Well, two years is certainly a long time ; but fortunately once activity is established the succeeding groups of children achieve results much more quickly. A teacher on a Short Course this summer (1941) seeing some samples of the measured

work in Paper and Cardboard and Book Crafts done by the Lankhills children, said, " But how do you start? We can't get dull children to do such fine accurately-measured work." The answer is, of course, " Neither could we—for a long time."

2. Before School Gardening was Started

(a) *Garden Work.*—Before the introduction of School Gardening sixteen years ago, the elder boys at Lankhills used to spend half the school sessions each week working in the garden with the gardener. They did the labouring jobs, chiefly digging (the boys worked in a line), sweeping drives and paths, and tidying the grounds. All this work is necessary, but the whole series of operations that constitute garden culture was not carried out by the boys. There was certainly no planning of operations by the boys themselves. The gardener was responsible for raising as large crops as possible from extensive kitchen gardens and for keeping the grounds tidy. His view was that if the boys did the more skilled jobs they might (and would) make mistakes and the result would be poorer crops. So the boys did the chores.

(b) *Difference in Aim—Teachers and Others.*—It may be well here to digress a little to stress the difference in outlook between teachers and other staff in a residential school. The aim of a gardener or a cook or a laundress is to get a piece of work accomplished. If, in a residential Special (M.D.) School, elder children regularly spend some of their school sessions working with these people—as in some schools they do—they acquire little or nothing in the way of real knowledge and skills. Such children are (at first, and always, unless carefully educated) very slow. It is much quicker for these workers to do the job, or most of the job, themselves and to give the children the odd jobs to do. It is even necessary to do this in order to complete work that must be done. But the teacher of Gardening or of Domestic Subjects has a different outlook. His or her primary aim is to educate children. The learning of the necessary techniques by the children is a slow business. Rate of work is slow and the amount of work accomplished at first is little. It does not matter. Once children have acquired the techniques, speed of work increases rapidly so that the

speed of work of even these dullest of children becomes comparable with that of well-taught children of middle ability.

In Residential Schools, in which education is comparatively costly, a policy of placing the training of children in non-professional hands is uneconomic. The additional charge for wages and salaries incurred by employing skilled teachers for this work is small when compared with the huge expenditure from public funds that is entailed by the lifetime maintenance of children inadequately educated.

3. The Introduction of School Gardening

(a) *The Beginning.*—School Gardening was started at Lankhills by a group of ten boys who were given individual plots. The teacher had a demonstration plot. All theory teaching was of the "on the spot" type that has been found successful with duller children. The boys seemed interested, but their interest did not appear to inspire them to action. They seemed unable to tackle the more skilled jobs. Even after careful demonstration by the teacher on his plot, they failed to practise what they saw. The only problem set them appeared to be that they had to practise in "a new environment", *i.e.* on their own plots. For the first year, a cropping plan, common to all the plots, was worked out with the group, but the boys failed to understand and use a large-scale plan.

(b) *The First Two Years.*—In the first two years the crops were very poor indeed. Even the rows were not straight, and the efforts at hoeing resulted in some cases in the removal of the crops! We were almost in despair. As always, we sought first for fault in ourselves and in our methods. The teacher had the R.H.S. Certificate for School Gardening, had attended the Board's Course in Rural Science at Cambridge, had had years of successful teaching experience in Rural Science with children of middle ability and above, and of School Gardening with dull children. The methods used seemed suitable: tiny steps, visual methods. The emotional response of the boys seemed good. It was decided to give a trial to the activity for one more year.

(c) *The Third Year.*—In the third year there was a sudden leap forward. About half the boys in the group had left at the

end of the first year, and half at the end of the second year, so that in both the second year and the third year the group consisted of half who had had one year's experience and half who were new. A common cropping plan was still used, but the boys were now able to interpret it and carry it into practice, in their own plots. The striking feature, and the difference this year, was that the boys carried out operations *independently*. They appeared suddenly to have gathered confidence. They had always used lines for sowing, but now the rows sown were all straight, and were the right distance apart. The hoe was wielded skilfully, and the tops of seedlings were no longer cut off. In the autumn a small horticultural show was held in the classroom and the boys set out their own produce.

(d) *Subsequent Years :*

(i) DEVELOPMENT OF SKILL : From the fourth year onward, the boys have drawn out to scale their own individual cropping plans, and carried out all their operations independently, chiefly in their leisure time. Except for a day or two at the times of sowing and harvesting, little or no school time is now given to the subject. For some years no demonstrations have been given. A correct technique has been handed on from plot-holders to their successors. A normal procedure is for a younger boy, of his own initiative, to go and assist one particular elder boy. A little while before an elder boy is due to leave school a younger boy invariably comes with a request for his plot when he leaves, usually adding, " I know all about it. I've been helping him this year. I know about next year's cropping too."

(ii) EXTENSION : For some years now, 22 boys have had full-size individual garden plots. About seven years ago we saw one day what appeared to be a number of small graves dug underneath the trees at the edge of the playfield. Inquiry revealed that a number of small boys had bought themselves flower seeds at Woolworth's and were making flower gardens. The prongs of the garden forks suffered considerably from the tree roots (the strength of determined small boys is amazing), but the flowers flourished, in contradiction of all sound gardening theory, and so the following year 10 small boys were given plots on ground adjoining the gardens. (There are 48 boys in the school, of whom 32 have plots.)

(iii) INITIATIVE :

(1) One year a boy begged scrap wood from the caretaker and scrap glass from the Woodwork instructor, and in his spare time made himself a cold frame. In it he grew cucumbers. (None are grown in the school, and nothing was shown him.) Later two boys made another cold frame in the Woodwork class. The frames are used now for seedlings.

(2) Another year a large group of boys were seen working feverishly on ground round about the plots. They have transformed the surrounding rough wilderness into lawn, flower-beds, and a path. None of the staff suggested this, and none directed it. The work took several weeks, and was planned and directed by two or three bigger boys who had plots. The groups of boys worked very busily and happily.

(3) Several boys from time to time take up a little more ground. Some have made marrow-beds ; some small flower-beds (" More room for vegetables then on my plot ") ; one a rockery. (We suspect that some of the original rock plants found their way there from a private rock garden, but the successor to the rockery adopts a better method which he calls " swapping ".)

(4) From the time the Horticultural Show was started (third year) the gardener, to indicate possibilities, showed produce in each of the classes of produce exhibited. After four or five years of this, the practice was discontinued. The boys were producing some vegetables that were superior to those grown by the gardener. No professional gardener could possibly carry out in a big garden the intensive culture carried out by a boy on his plot. In dry weather especially (the soil is a light sandy chalk) the regular constant hoeing of an interested boy gave good results.

4. Social Value

The educational value of this activity seems quite obvious. The planning of an independent cropping plan to scale, the planning and carrying out of sequences of operations, the observation, comparing, and contrasting, appear to exercise the boys' " problem-solving apparatus ".

We believe that just as important to the boys as its educational value has been the social value of School Gardening. The boys are critical of their own efforts and plots, and of the work of others. Of their own initiative they help one another. A common sight any evening in the summer is a boy who has been working on his plot going over to see another boy. One will hear, " I found it best to do so-and-so, Bill ", or, " Your onion seeds haven't come up : would you like some of my plants when I thin out ? " or, " I'll give you a hand with that ", or, " What are you going to do about your carrots ? " In some mysterious way gardening breeds a sort of camaraderie. Those of my readers who are gardeners will know this. Then think of the tact and social graces developed through gardening. From time to time a boy displays great zeal in helping the housemaid (boys' house). " Shall I empty your bucket for you, Kathleen ? " " Can I get you some coal ? " A few days later, " I've got some fine peas on my plot, Kathleen. I suppose you wouldn't like to cook some for me in the pantry for my supper to-night, would you ? " We hope none of our colleagues in residential schools will condemn the turning of a blind eye to these irregular practices.

5. Disposal of Crops

Boys are permitted to sell some of their crops to members of the staff. Boys with plots frequently supply with salads all the boys sitting at their table in the dining-room. Most of their potato crops and some of their vegetables they supply to the school as a payment in kind for rent. They keep some of their potatoes and on winter nights bake them under the classroom fires. Their own potatoes, baked by themselves—often half baked—are of course far superior to the nicely cooked potatoes that come from the kitchen !

6. School Gardening for Girls

Six years ago School Gardening for girls was introduced. Eleven full-size individual plots were brought into use for a School Gardening group, and eight smaller plots were given to other girls. Progress followed the same course as it did with

the boys : very poor results indeed for two years, a great improvement in the third year, and successful work subsequently. Until the outbreak of war the girls grew more flowers and fewer vegetables than the boys. War has imposed a duty of growing vegetables. In each of the two summers immediately preceding the war, a Flower Show for the girls was held in the classroom. A pleasing feature was the selection and arrangement of the flowers by the girls, showing that the influence of the lessons in Art went beyond the classroom walls. The girls now also cultivate communally a large rock garden and a long wide bed bordering their drive and plots. They make use of a cold frame.

7. Why Prolonged Failure precedes Success

(*a*) The explanation that will immediately suggest itself to some teachers and psychologists is the old assumption that there is slow-learning by the dull child. Most believe that it takes a very dull child (in this case so dull as to be classified feeble-minded) a long time to acquire new knowledge and new skills. They will account for the quicker learning we found at the later period by stating that the knowledge and skills are not then new. This will not do, however, because :

(i) *The assumption that the dull child is slow-learning is only partially true.* It is true in the case of acquiring knowledge and skills through the medium of words, because the gv abilities in such children are poor. But it is *not* true in the case of these particular children acquiring knowledge and skills in concrete situations, because their gF abilities have a mean that approaches closely the line of middle gF ability. Moreover, as we have shown with definite examples in the chapter on Country Dancing, and as can be deduced from reading the chapters in this book on the other practical subjects, the *rate* of learning *new* work is that of average children, and perhaps, because of the good intellectual habits it has been possible to develop, even quicker than that of some average children.

(ii) Further, the work in later years is still new because about half of each of the groups engaging in these practical activities leave school each year. That means that at the

beginning of the second and of all subsequent years half the group have had one year's experience and half are new. This does not, therefore, account for utter failure for so long a period as two years, followed by several years' maintenance of a high standard of work.

(*b*) A second possible explanation appears to be the improvement and development of our techniques of teaching and learning. This does not appear a satisfactory explanation. When School Gardening was introduced for girls, progress followed the same course of prolonged failure that had been experienced by the boys. Yet by that time gardening had for some years been a highly successful activity of the boys, and our techniques of teaching and learning were fully developed.

(*c*) A third explanation has been considered. The mean gF ability of the children at Lankhills has been practically a constant over some years (91–96). Suppose we assume that successful attainment in any educational activities is dependent on the joint operation of two sets of factors, the intellectual and the emotional factors. In these practical activities the intellectual factors operating appear to be the gF factors. Now these have been constant. It would appear then that the emotional factors have been variable. This may be so. There is at present no means of measuring emotional factors objectively. But throughout—even in the two years of complete failure—there appears to have been real interest. Powers of concentration and habits of steady work in educational activities generally were well developed in all the children who became engaged in the later new activities (Country Dancing, Girls' School Gardening). A constant stream of visitors failed to cause distraction. Yet these activities exhibited the same phenomenon. Variability in emotional factors does not appear to us a satisfactory explanation.

(*d*) One other possible explanation has been suggested. We have observed that in out-of-school hours, skills in Country Dancing and in School Gardening appear to be passed on from older to younger children. From time to time in the yard or the playfield will be seen an older girl spending a few spare minutes in teaching dance steps and dances to a little group of younger girls. Younger boys go and help older boys to

cultivate their plots. These procedures are entirely on the initiative of the children themselves. It may account to some extent for the fact that once a high degree of skill is established in a group, it is passed on by the members of the group to their successors, and so maintained. Beautiful dancing and well-cultivated plots may tend to become traditional.

8. For C Children

The work that has been outlined in this chapter is within the capacity of all the eldest C form children in a three-stream rural Senior School. The children at Lankhills are none of them above the intellectual level of the poorest five in any C class. The following is the scheme of work that was in use in the rather earlier years of the activity before the boys' gardening technique was as highly developed as it is to-day. It is given in case it may help colleagues elsewhere who are starting this activity with C classes. Those with some years of experience in teaching School Gardening with C classes will probably be doing rather more advanced work ; perhaps more theory and work on the lines of the Scheme, given in Section 9, planned for B boys.

SCHEME OF WORK

C Class

(*a*) Boys have individual plots of not less than 1 square pole in area. They keep garden note-books.

(*b*) (i) In October and November they trench or double-dig their ground. (Demonstration by teacher. This work is then done in their own time, not in school session time.)

(ii) Lessons (on the spot) on Soils, Digging and Trenching, Manuring, Rotation of Crops : simply and with reasons. Notes of these lessons later in books.

(iii) 1. Measurement of plots by boys themselves : measurements marked on rough sketch, then drawn to scale in note-books.
2. A second drawing divided for three-years rotation.

(iv) Plots pegged as in (iii) 1, using yard-sticks marked with feet. Two parts (for greens and potatoes) manured. The third part (for roots) given no manure. Reasons explained.
(*Note.*—Light soil at Lankhills, therefore spring manuring.)

(v) Cropping plans drawn in note-books by boys individually after chat about cropping.

(vi) Demonstration of preparation of ground for sowing, use of line, making drills, sowing.

(vii) Boys, each with yard-stick as above and a copy of his cropping plan on loose paper, do sowing.

(viii) Potato planting, after demonstration of method.

(ix) At right times cultural processes demonstrated and practised : weeding, thinning, hoeing, earthing-up potatoes. Chats on the spot ; reasons.

(x) Care of paths. Care of tools.

(xi) In September a Horticultural Show is held in a classroom. Preparation and display of produce in morning, judging in afternoon. Small prizes for the best in each class of produce and for the best-kept plots.

(*c*) Time given to this : one session per week when necessary. Most of the actual practical work is done by boys in their own time. (Sowing needs school time.)

(*d*) Correlation with—

Drawing : water colour, pastel, and pencil studies of produce.
Arithmetic : measurement—drawings to scale of plots. Weighing of produce. Costing.
English : composition, oral and written.
Woodwork : making labels, dibbers, boxes, trays, etc.

9. For B Children

My experience extends to classes of boys of higher intellectual levels. In drafting schemes suitable for different levels, the general principle followed was to plan work for the dullest on practical lines, and to introduce for the brighter boys more difficult practical work and more theory and experiment. The following scheme was used successfully for some years with classes of boys of B level. It is given, not as a model scheme (which it certainly is not) nor for the expert, but to show an attempt made to grade work for different levels of ability. The thoughtful teacher will, of course, draft his own schemes. (It is of interest to note that in a school graded by gv ability, the middle boy in a B class in a three-stream *rural* Senior School has an I.Q. generally of about 90 to 93. Several investigations indicate that the mean I.Q. of children in rural schools is at about this level—and this would be, in a three-stream school, the level of the middle boy in a B class.)

SCHEME OF WORK

B Class

(a) *First Half-year :*

Practical

(i) Preparation of land : digging, digging in manure ; use of spade and fork.
(ii) Renovation of paths. Sowing in boxes.
(iii) Preparation of seed bed. Use of rake.
(iv) Sowing : making drills, use of hoe and line. Methods of sowing various vegetables, flowers.
(v) Potato planting.
(vi) Transplanting and bedding.
(vii) Care of plants, etc. Weeding, hoeing, watering, thinning, earthing up, spraying.
(viii) Preparing vegetables for use.
(ix) Care of lawns—mowing, clapping.
(x) Use of greenhouse and frames.

Theory (very simple)

(i) Soils : formation, kind, improvement.
(ii) Choice of site.
(iii) Capillarity.
(iv) Plant foods.
(v) Manures.
(vi) Germination ; seed testing.
(vii) The potato.
(viii) Spraying and the sprayer.
(ix) Pruning.
(x) Greenhouse and hothouse.
(xi) The Mower.
(xii) Flower culture.
(xii) Weeds and their suppression.

(b) *Second Half-year :*

(i) Care of crops, as in (vii) above ; staking peas ; celery trenches ; sowing for succession.
(ii) Hedge cutting and care of lawns.
(iii) Preparation of produce for kitchen.
(iv) Harvesting of crops. Storing —*e.g.* making clamps, bunching onions.
(v) Pruning.
(vi) Propagation : budding, cuttings.
(vii) Rough digging. Bastard trenching. Manuring.
(viii) Planting shrubs, bush fruit, etc.
(ix) Bulb culture.
(x) Use of greenhouse and frames.

(i) Rotation of crops.
(ii) Propagation : methods.
(iii) Harvesting.
(iv) Storing.
(v) Autumn operations.
(vi) Bulb culture.
(vii) Successional sowing.
(viii) Decorations.
(ix) Revision of lessons above.

REMARKS

(i) Boys have individual plots of from 1½ to 2 square poles in area. In

addition there are plots in common use: fruit, shrubs, lawn. A greenhouse and cold frames are used.

(ii) Theory lessons will be given in schoolroom weekly.

(iii) Boys will be made familiar with prices of seeds, vegetables, tools, etc.

(iv) In his note-book each boy will keep his notes and sketches and a diary of operations done. This will be used in school at intervals for extension into written composition.

10. For A Children

Class A children with their higher gv levels are capable of work that is much more verbal and abstract. Their work in School Gardening can be on wider lines, becoming Rural Science rather than School Gardening. The interests of the teacher will of course largely govern the direction taken in Rural Science. We believe that any of the aspects of Rural Science can be presented to children by an enthusiastic teacher in such a way that they afford valuable channels for educational activity. Bee-keeping, mycology, plant ecology, simple biology, simple experimental physics and chemistry applied to gardening, and the study of wild flowers, are just a few of the possible avenues in rural science along which activity can be directed by an interested teacher. A Scheme of Work in Rural Science for children of A level is given here. Again we would stress that it is not thought to be a model scheme, but it is a scheme that was used successfully for some years. If it is compared and contrasted with the schemes given for C's and B's it will indicate the way in which grading of work was made for different intellectual levels. (It is of interest to note that the classes using this scheme had a mean gv I.Q. of about 105.)

SCHEME OF WORK

A Class

(a) *Method*

(i) Individual plots to be used. In addition to cultivating these plots, boys will assist with the cultivation of the botanical section, fruit plots and experimental plots. Garden and tools to be cleaned up after each lesson.

(ii) 1. On each assignment (these boys worked on a modified Dalton plan) work in rural science will be set. The practical gardening and outdoor experiment will be done at fixed times. The indoor experiments will be performed at any time during the fortnight; the apparatus will be available each day so that boys can use it in

rotation. (A good microscope, two magnifying glasses, and a good balance are available.)

2. When beginning the assignment, the experiments set will be discussed and methods of proof suggested. In some cases demonstrations by the teacher will be given. The actual experiments will be performed by each boy individually or in small groups without the teacher's assistance.
3. Notes showing the problem, the method of solution, and the actual result will be made by each boy as he completes an experiment. With certain problems, *e.g.* mechanical analysis of soils from different plots or fields, the results of the whole class will be tabulated by each boy (each recording his result on the blackboard after entering it in his note-book).
4. Note-books will also contain : plan of garden, cropping plan, sowing table, notes on lessons given, diary of operations, drawings and diagrams, financial statement, plan of botanical and herbaceous sections.
5. Exercises in English books will be written : letters requesting plot, catalogue ; seed orders, etc. ; essays on lessons, operations, etc. Gardening arithmetic will be set.

(iii) 1. Garden requisites will be made and repaired by boys.
2. Boys will pay for plot, use of tools, seeds, plants, etc. They may sell or give away produce, but all must be valued and entered.
3. Flowers to be used for decoration of schoolrooms, etc.

(iv) The teacher will keep ledger for purchases, give the technical lessons, prepare notes of lessons, demonstrate the proper use of tools and of methods of sowing, planting, etc.
He will give the necessary theory lessons, and supervise indoor experiments.

(v) 1. Gardening papers and books are available. Work to be set entailing their use.
2. Class to visit collection of pests at Museum.
3. Class to visit other gardens.

(vi) Reasons for failure of any plots or crops will be sought. A reference library is available.

(b) *Theory, and Indoor Experiments*

(i) Soils : Formation, parts of a soil, improving soils. Experiments to show that—

1. Soils contain water, mineral and organic matter : results tabulated showing percentages.
2. The mechanical analysis of soils : results tabulated as in 1.
3. Soils contain soluble matter.
4. Method of testing for lime (attempt quantitatively).
5. Physical properties of sand and clay differ in capillarity, porosity, specific gravity.
6. Temperatures of soils differ ; fields with northern and southern

aspect respectively and at various depths to 2′. Temperatures taken daily at same hour for a week. Graphs plotted.

(ii) Weathering : The action on soils and crops of—
1. heat and sunshine,
2. cold, frost, and snow,
3. rain and wind.

(iii) Germination :
1. Use of germinating box.
2. Seed testing.
3. Experiments to show that—
water is absorbed by seeds during germination ;
air is required during germination ;
carbonic acid gas is given off during germination ;
the food required is in the seed ; and
the radicle persists in growing downwards.

(iv) Reproduction :
1. Pollination ;
2. Fertilisation. Work of bees.

(v) Structure and functions of roots, stems, leaves, flowers. Feeding of plants. Experiments to show—
1. growing plants transpire water through leaves (note connection with Economic Geography—Forest Regions) ;
2. water passes off through leaves ;
3. the percentage of water, organic and mineral matter in various plants. (Take a moorland plant and an aquatic plant.)

(vi) Manures :
1. Natural : reasons for working the soil.
2. Artificial : uses of lime.

(c) *Technical*

(i) Propagation by seed, cutting, bulbs, layering.
(ii) Rotation of crops.
(iii) The potato.
(iv) The weeds in the garden and how to deal with them.
(v) Common pests.
(vi) The cold frame and its use.
(vii) Flowers for the garden.
(viii) Vegetables for the garden.
(ix) Fruit for the garden.
(x) The botanical section.
(xi) Methods of storing.
(xii) Care and use of tools.

(d) *Practical*

(i) The use of tools. Common operations, *e.g.* digging, sowing, planting, hoeing, weeding, harvesting, storing.
(ii) The cultivation and care of common vegetables, *e.g.* lettuce, turnip, beet, carrot, onion, parsnip, cabbage, peas, beans, radish, potato, cauliflower.
(iii) Sowing for succession. Use of small frames. The whole to be worked to a calendar of operations.
(iv) The cultivation and care of flowers for school decorations, etc.

(v) The cultivation of fruit, *e.g.* gooseberry, raspberry, currants.
(vi) Taking cuttings. Use of frames.
(vii) Budding, grafting, pruning.
(viii) Collection of weeds and seeds.
(ix) Harvesting and storing of crops.
(x) Application of manures, soot, lime. Treatment of pests.
(xi) Experiments :
1. With grasses (for hay).
2. Manurial.

(e) *Continuation of Scheme*

All the boys in this class work through this general scheme. Further work in *one* of the following will be done by small groups of from 2 to 4 boys .

(i) Plant ecology :
1. Studies of a section through a hedge and ditch.
2. Comparative studies of two pegged areas each of a square yard of ground in two pasture fields.
(ii) Studies of pond life.
(iii) Studies of moorland plants, noting habitat.
(iv) Studies of all insect and fungoid pests, and of crops that do badly in any of the school garden plots.

(*Note.*—A good reference library for use by boys doing these studies was built up.)

Notes

(*a*) Readers will observe that studies of birds and trees were omitted from this scheme. The educational value of these particular studies is quite well known. The omission of tree studies from the scheme was due to the paucity of trees in a rather bleak and windswept locality nearly 900 feet above sea level ; the omission of bird studies to the limitations in knowledge of the town-bred teacher.

(*b*) An indication of the method used in the individual experimental work that was carried out in the classroom may be of interest. The boys worked on a modified Dalton plan (an example of an assignment of work in all subjects is given at the end of this chapter).

For the Rural Science experiments a series of cards covering the course was made. In all experiments boys recorded independently in their note-books exactly what they did and what they observed, and at the end they answered any questions asked on the card. Examples of contents of the cards :

PLANT STUDIES

Preliminary Experiment

Apparatus and Material: small quantities of starch, sugar, salt, bread-crumbs, iodine solution; plate.

(i) Put a small quantity of starch on a plate. Pour over it a few drops of iodine solution. What happens?

(ii) Repeat with sugar, with salt, and with bread-crumbs. What happens? What is the effect of starch on iodine?

Experiment 1

Apparatus and Material: a green leaf (geranium or bean); methylated spirit, beaker, a plate, iodine solution.

(i) Pull the leaf on a bright day, if possible after some hours of sunshine.

(ii) Soften it by boiling it in water for a few minutes.

(iii) Place it in methylated spirit in a beaker. This is to remove the green colouring matter (chlorophyll). Leave it to soak for a day or two.

(iv) When all trace of green has gone from the leaf, remove it from the beaker. It is now brittle. Dip it in boiling water to soften it.

(v) Lay the leaf on a plate and pour a few drops of iodine on it. What happens? What does this prove?

Experiment 2

Apparatus and Material: a healthy pot plant (geranium), beakers, iodine solution, methylated spirit.

(i) At playtime in the afternoon, after the plant has stood in the sun all day, remove one leaf.

(ii) 1. Extract the chlorophyll as in your last experiment, and after softening the leaf put it away safely.

2. Put the plant in a dark cupboard for two days, then remove a leaf and treat it like the first.

3. Leave the plant in sunlight for some hours, then remove a third leaf and treat similarly. (By cutting stalks of different lengths the leaves may be distinguished without keeping them apart.) Test all three leaves for starch. What is the result?

Q. 1. How can you prove that the life of a plant does not come to a standstill immediately the plant is put in the dark?

Q. 2. What may be learned from the third leaf that you did not know from the first?

11. For Younger Dull Children

A class of younger children at Lankhills has for some years done some Nature Study. Most weeks, for 1½ hours on one afternoon per week, they go out of doors with their class teacher. (The Time-table shows alternative Nature Study

or ART on two afternoons a week in order to permit a choice of afternoon in relation to weather conditions.)

SCHEME OF WORK IN NATURE-STUDY

YOUNGER DULL CHILDREN

(a) *Aim.*—By some elementary study of a few of the simpler phenomena of animate and inanimate nature, to deepen the interest of the children in the world around them, and to train them in habits of careful observation and clear thinking. (The systematic study of any branch of Physical Science is beyond the capacity of these children, but the mental habits acquired by this simple study appear definitely to help in forming desirable characters.)

(b) *Scheme* (walks are taken during school sessions to observe things on the spot) :

(i) The bud in winter.
(ii) Opening of bud and unfolding of leaves and flowers.
(iii) Flowers.
(iv) Growth of fruits and seeds.
(v) Falling of leaves.
(vi) The common hedgerow at different seasons.
(vii) The flora of the downs.
(viii) The flora of the water-meadows and river-banks.
For (vii) and (viii)—wild flowers are collected, arranged, and named.
(ix) Trees of the woodland (with seasonal study of trees on school estate).
(x) Common weeds.
(xi) Birds.
(xii) Aquaria (Spring Term) : In two seasons there was a special study of a pair of newts. In other seasons other pond life has been studied.
(xiii) Correlation with—
1. Drawing : nature note-books for sketches ; flowers, etc., drawn.
2. English : compositions written ; chats about walks, etc.
3. Gardening : discovery of weeds, etc. (Some of these children have small plots of ground which they cultivate.)

Notes

(*a*) The material available for observation differs with the environment, whether streets, parks, fields, woods, downs, etc., but one should make the most of the given surroundings.

(*b*) The scheme shows the type of work rather than the amount to be done in a year.

(*c*) Incidental lessons should be included (a hedgehog found

when children out for a walk, a bat caught in a bedroom, a special flower, etc.) even though it has no obvious connection with the work in hand.

(*d*) The children must be able to observe and reason for themselves about the subject of study, and full use should be made of their instinctive curiosity. The teacher should guide along the right lines. The observations should have bearings on one another and lead to some definite result.

(*e*) Parallel with the increasing power of observation runs the training in expression, oral and written description, drawing, and the making of objects. No description serves so well to record the varying appearance of a growing bulb or twig as a series of sketches. Accuracy and thoroughness are thus fostered and wrong impressions corrected.

(*f*) Rather than to fix so many periods per week for Nature Study, it is better in some seasons to have chats and make sketches every day, and at other times to occupy fewer periods.

12. Example of an Assignment of Work

In order to illustrate the method by which it was possible for a fairly large class of A level to carry out individual experimental work in the classroom with only a small amount of apparatus available, the following Assignment of Work is given. Except where time was stated (*e.g.* for a class lesson), work could be done in any order the boys chose, some perhaps doing Maths. first, some Geography. The apparatus for experiments was always set out and was used successively by boys as it became available. This particular assignment of work was completed by the slowest workers in the A class in 10 school sessions. (The quickest workers took 7 to 8 sessions and then did individual specialised work in one subject or small group of subjects. The especial line followed was the line of the particular interests of individuals.)

ASSIGNMENT NO. 5

(a) *English :*

(i) Reading

1. Class study of speech of Henry V before Agincourt (Monday, A.M.).
2. Learn this speech.

(ii) Composition
1. Paraphrase the speech.
2. Write a letter to a newspaper on some subject of current discussion.

(b) *Maths.* :

(i) Make square prism and square pyramid in cardboard, base 1″ sides, vert. ht. 2″. Compare volumes.

(ii) Find the weight of iron piping that carries the sprays in the lavatory. (One side of the lavatory only.)

(iii) Draw a graph of midday temperatures for the first half of June. Find mean midday temperature. Compare with average for 10 years or so.

(c) *Geography and Economics* :

(i) Read in *Gateways of Commerce* the chapters on Bread, and Fish. Test on Tuesday afternoon of second week at 4 P.M.

(ii) An oral lesson on the Four Agents of Production will be given you. *After* the lesson read up in *Wealth and Work*.

(d) *Rural Science* :

(i) 1. Make a mechanical analysis of the soil of your plot (class record to be made on blackboard).
2. Prove that soil contains soluble matter.

(ii) We shall make a collection of every kind of weed in our class gardens. (Alec Carter to organise this for Wednesday, A.M., second week.) Each of you take him specimens : identify first.

(e) *Metal Work* : Tuesday, A.M.

(f) *Physical Training* : Tuesday, A.M.

13. An Explanation and an Apology

(*a*) No books have been referred to in this chapter, for the reason that it is some years since the writer taught Rural Science with brighter boys ; but the specialist teacher will know of and use many books, and the general teacher wishing to begin these activities can obtain ready advice on book-choice from the Horticultural Adviser of his Local Education Authority.

(*b*) We must apologise for the fact that the assignment belongs to nearly twenty years ago ; but the method of approach still appears educationally sound and not old-fashioned. It will exercise the problem-solving apparatus of the youngsters. Much of it entails work in searching, comparing, contrasting, and grasping relationships. There are problems in concrete situations.

In the Maths., the first exercise is to *establish*, by what we should now call gF methods, the formula for finding the volume of the square pyramid. The second was purposeful because

of building alterations that were being effected, and could be solved in two ways : (1) by measurement of external and internal diameters with callipers, and of length, followed by calculation ; (2) by weighing a loose length of the pipe that was available, and calculating by ratio. The data for the third problem were available from a class of younger boys which had collected it over years.

In the Geography work the application of the subject to everyday life will be noted. The Economics lesson, needless to say, was illustrated by local known examples. In the Rural Science work no instruction was given as to notes because it was a routine matter always to record exactly what was done and what was observed, and to write as tersely as possible.

It may be observed that no work in History was set in this particular assignment : I forget why. This class studied applied History : one year History of Agriculture ; one year Industrial History ; and for several years History of Architecture, with visits to many buildings of architectural interest, where sketch-notes were made.

Chapter XV

ENGLISH

1. English and gv Abilities

For work in the practical subjects gF methods are obviously possible ; they are, however, also practicable in some subjects of more academic type. In Number and Mathematics, for example, an attempt has been made to indicate some lines of gF approach and gF application. History and Geography certainly lend themselves to this treatment : but English offers a special problem, because success in English depends so largely on gv abilities and chiefly on v.

(a) *Factor Analysis.*—Dr. Alexander [1] states that success in Mathematics depends on three principal factors, which, taken on a percentage basis, are g 31, v 19, X 49. (The small residual percentage is stated to be n, the number factor.) Readers are familiar with g and v. X is probably a factor in character, and is assumed to be " long-term persistence ". From this analysis, success in Mathematics appears to be dependent to the extent of 50% on gv factors.

In English the relative importance of the three factors is stated to be g 10, v 63, X 27, *i.e.* a dependence to the extent of 73% on gv factors.

Feeble-minded children are the poorest (3%) of all children in gv abilities. In verbal ability they are vastly inferior to children of middle gv ability, and much inferior even to the brighter children in C classes. For this reason a scheme drafted for feeble-minded children, as is the one given in this chapter, will not be very useful to teachers of brighter children. Some of the exercises based on the most advanced stage of the scheme may, however, be suggestive to teachers of C and B classes. The account of investigation into reading attainments and of some unusual findings may be of interest to teachers generally.

[1] *The Educational Needs of Democracy*, by W. P. Alexander (University of London Press).

(b) *Vocabulary and gv Abilities.*—There appears to be a high correlation between placings by a vocabulary test and those by a test of general intelligence (of gv type). It is useful to know this if one is going to use the Stanford Binet Scale to test a child of unknown intellectual level. A vocabulary test is a component of this Scale at several age levels. An average child at 8 years gets a score of 20 words ; at 10 years a score of 30 words ; at 12 years a score of 40 words. By applying the vocabulary test as a preliminary measure, an approximate mental age placing is found. The testing will then be continued by applying the tests for the age group one year or two years lower than the age indicated by the vocabulary test.

(c) *Reading and gv Abilities.*—Comparison of the results obtained from standardised tests of Reading and tests of Intelligence reveals that the placings by pairs of such tests correlate closely. In one investigation with a group of 300 children the coefficient of correlation was nearly 0·9 (1·0 is identical placing, 0·0 completely haphazard, −1·0 is total dissimilarity and 0·6 and upwards indicates highly significant correlation). Reading attainments apparently march very closely with gv abilities.

(d) *Significance to Teachers.*—Children of low gv abilities—the feeble-minded, the dull and backward—are unable to acquire high attainments in reading. Their facility in using the reading technique will never be sufficient for them to acquire knowledge readily from books, or to benefit very fully from an education through the medium of words.

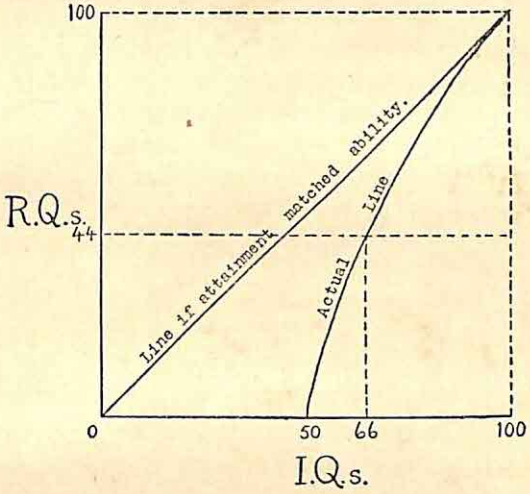
2. Lag of Reading Attainments behind Ability

We believe that there is a general tendency for the reading attainments of children below middle gv ability to lag behind their abilities. Two observations appear to support this belief :

(*a*) Children generally on the line of middle gv ability (I.Q. 100) have Reading Quotients (Mechanical Reading Test) level with their mental quotients. But children with I.Q.s of 50 and below cannot read at all, nor can they be taught to read.

(*b*) Children in Special (M.D.) Schools generally, leaving school at the age of 16 years, attain a mean Reading Age of about 7 years. Dr. Cyril Burt has quoted this figure in his

books and lectures. A mean reading age of 7 years at 16 years of age gives a mean Reading Quotient of 44. But Special School children have a mean Intelligence Quotient of about 66. Attainment therefore shows a very considerable lag at a gv ability level of 66. In view of the statement in the preceding paragraph—attainment at zero with a gv ability of 50—this considerable lag might be expected. A reasonable assumption would be that there is a gradually increasing lag of reading attainment behind gv ability as descent is made in the intelligence scale. This can be represented graphically as follows :



3. Should this Lag Exist?

The data given apparently support an argument that this lag should exist. Yet for reasons beyond our comprehension there has been no lag at all at Lankhills for the past twelve years. The following data are available :

(*a*) The Mean Reading Age (Burt's Tests of Mechanical Reading [1]) of the children leaving Lankhills at 16 years of age during the past twelve years has been 11½ years. This gives a mean R.Q. of 72. The mean I.Q. (Stanford Binet) has been 66.

(*b*) Year by year Mean I.Q. and Mean R.Q. of all the

[1] *Mental and Scholastic Tests*, by C. Burt (P. S. King).

children in the school (tested yearly) have been compared. This comparison is different from that in (*a*), because included in the yearly results of the Reading Attainments Test are the figures for the 20% or so of the school population who have been newly admitted within the year, and who are generally educationally retarded. Despite this the mean R.Q. has never in any year been lower than the Mean I.Q.

(*c*) The mean annual Reading Progress (yearly measurement, Burt's Test) over a period of 12 years is just over 0·9 of a year, with a range of from 0·87 of a year to 0·94 of a year. These figures appear high for feeble-minded children. Reasonable expectation is for a child of I.Q. 100 to make one year's reading progress in one year, and for a child of I.Q. 66 to make 0·66 of a year's progress in one year, provided that a lag in attainment is not in the natural order of things. The high figure is accounted for by the accelerated progress of *retarded* children, *i.e.* of those whose attainment lags far behind their ability at the time of admission.

Later in this chapter we shall seek reasons for there being no lag among this particular group of children at Lankhills.

4. Reading for Comprehension

So far we have been considering attainments only in mechanical reading. Reading for comprehension is the only kind of reading that has real importance. Yet the results of a mechanical reading test have been given because results of applying this test to children elsewhere are available for comparison. At Lankhills, tests of Reading for Comprehension have been applied for some years to all elder children. They show that at leaving age these children have a mean reading age (Comprehension) of about 11·0 years. That is to say, half the children leaving Lankhills have Reading for Comprehension ages of upwards of 11·0 years. It has not hitherto been possible to obtain figures for comparison for children of this intellectual level elsewhere, either in this country or in the U.S.A. or the Dominions. Several of our colleagues working elsewhere with feeble-minded children have told us that only a few of these children are at 16 years of age capable of tackling a Reading for Comprehension Test. Our own experience is that

Lankhills children who have mechanical reading ages of below 9 years are unable to do the Comprehension Test. For this reason the Comprehension Test is not applied to younger children here. As the mean reading age (mechanical) of feeble-minded children elsewhere at the time they leave school is 7 years, there would probably be few children reaching the minimum reading age of 9 necessary for solving a Comprehension Test.

The Comprehension Test used for some years at Lankhills is Watts's Metropolitan Reading Scale. It is used as a group test. The Scale has been published in the form of a test of mechanical reading.[1] By the kind permission of Mr. Watts it is reproduced in an Appendix to this book in the other form in which he planned it, viz. as a test of Reading for Comprehension. Those of our colleagues who use this admirable test will find among its merits careful grading, and ease and speed of application.

5. Why Reading Attainments match Ability at Lankhills

The standards of Reading Attainment at Lankhills are exceptionally high, possibly unique, for children of this intellectual level. Many visitors to the school have sought possible explanations. By a process of elimination the only reasonable explanation appears to be " transfer of training ".

(*a*) Is there any doubt as to the accuracy of the statements or of the figures? None. Many competent people have observed and checked.

(*b*) Are the exceptionally high reading attainments due to exceptional methods used in the teaching of reading? No. The same agglomeration of methods is commonly used.

(*c*) Are they due to exceptional teachers? No. Equally able and devoted teachers work everywhere.

(*d*) Are they due to the exceptionally favourable environment afforded by a residential school? No. Comparison has been made not only with Day Schools for M.D. children but also with Residential Schools. The latter in general show no higher reading attainments than the Day Schools. There is

[1] *Research in Education*, by A. F. Watts, The Third Tibbey Memorial Lecture (Nat. Assoc. of Head Teachers).

a Residential School in Denmark staffed with very able teachers, with physical conditions superior, and with emotional conditions at least as good as at Lankhills. At the Danish School Stanford Binet tests and Burt's Reading Test are used. The range and mean of I.Q. are the same as at Lankhills. The Mean Reading Age at 16 years is about $7\frac{1}{2}$ years—the same as in Special Schools generally in England—against Lankhills' about $11\frac{1}{2}$ years. Other residential schools must afford environmental conditions as good as, and perhaps superior to, those at Lankhills.

(*e*) Are they due to the general educational methods used in the other subjects in the curriculum, and so due to some form of transfer? Yes. We believe so.

The essential difference between Lankhills and all other schools for children of the same intellectual level is that the methods at Lankhills in activities generally are based on certain definite principles. Spearman's principles are interpreted in practice in terms of exercises in concrete situations. These gF exercises are planned and graded with a view to stimulating thought at the highest possible level for each child. It appears as if the good intellectual habits that are set up in other activities (habits which cannot be developed by emotional stimulus only) are transferred. The argument that any educational methods used systematically by inspiring teachers will meet with equal success does not appear to be true. Such an argument applied to bright children may be partially true because for bright children method is not so important. They will learn in any case. Applied to children of this very low gv level the argument is obviously false, because there are very many inspiring teachers elsewhere who work systematically, but, so far as is known, there is no other group of children of the same intellectual level who even approach this standard of reading attainment.

If this phenomenon cannot be attributed to "transfer", how can it be accounted for? Professor Hamley[1] writes:

> Professor Burt has summed up the modern view very clearly in a Report presented to the British Association in 1930: "Transfer of improvement occurs only when there are common usable elements, shared both by the activity used for the training and also by the activity in which the results

[1] *Educating for Democracy*, ed. Cohen and Travers (Macmillan).

of the training reappear. The ' common elements ' may be elements of (1) material, (2) method, (3) ideal ; they are most usable when they are conscious. A common element is more likely to be usable if the learner becomes clearly conscious of its nature and of its general application ; active or deliberate transfer is far more effective and frequent than passive, automatic, or unintentional transfer. This seems especially true when the common element is *an element of method* rather than of material, *an ideal* rather than a piece of information."

Patrick Meredith [1] has reviewed the whole field of investigations into Transfer of Training. He shows the danger of making deductions from investigations which are not really scientific, in which terms are not precise (*e.g.* Latin as taught in one school is different from Latin as taught in another), and in which the variables are not reduced to one. Cox's experiments, mentioned by Meredith, and our own observations, lead us to a view that narrow skills developed by *training* do not appear to be transferred to other activities ; but that methods of work on *educational* lines, which develop good habits of thinking and doing, are carried over to other activities.

The arousing of a keen desire to be able to read, *i.e.* stimulating emotions, is undoubtedly of importance. This inward urge that enables these children to persist in order to acquire the technique of reading appears to be due in some measure to the fact that there is a purpose in learning to read which is kept in view. All the children in the School see constantly that they will not be able to do Cookery work or Handwork unless they can read written instructions—and they all want very much to take part in these activities. All want to read " comics " and newspapers and league tables, and keep scores at cricket and stoolball matches. All know that when they leave school and go to work they may have to work from written or printed instructions.

The interest of the Chairman of the School Managers (Miss C. A. Kingsmill, J.P.) in the reading attainments of the children, sustained over many years and expressed in a practical way, has undoubtedly been a means of stimulating effort. Each year for the past fifteen years Miss Kingsmill, in addition to providing many new books for the school library, has awarded

[1] *The Transfer of Training*, by Patrick Meredith, reprinted from *Occupational Psychology*.

prizes, not for the best readers but for the children who make the most progress in each group. Even the poorest readers know that they have the chance to win a prize if they make steady effort. The prizes are awarded on the results of the yearly application of Burt's Mechanical Reading Test. The ethics of rewards have been the subject of much discussion. Prize winners in general are often those whose merit lies in their having chosen intelligent parents ! Study of the gv levels, the reading attainments and the annual reading progress of Lankhills children who have won prizes for reading progress, lead us to a view that among these dullest of children, steady persistent effort is a big factor in their process of acquiring the technique of reading. Effort can be stimulated so that good intellectual habits are developed. We would add, too, that " Reward sweetens labour ".

The desire to be able to read is very strong. The sustained efforts made by the children are a source of wonder to us. Poorer readers sometimes take their books out from school with them, at their own request, and can be seen slogging away in odd moments, often at meal times. We should never think of inflicting this upon them. Our thought has often been that if we ourselves had had the same difficulty we should never have made such effort. This leads to the thought that probably in the case of most normal people attainments fail to match abilities, and that what is now considered *average* attainment for a certain level of ability could be very much higher.

6. Methods

The method used at Lankhills is a mixture of methods, with a few special features. The basis is a phonic method (sounds of letters) supplemented by some look-and-say words and, both in approach and in later stages, by a form of Decroly [1] method.

Most readers will know the Decroly method, in which whole sentences and pictures or objects are used. From the beginning, associations are established between sentence-form (visual image of the group of words forming a simple sentence) and the *meaning* of the sentence. Later associations are set up between word-form and word-meanings. It is claimed that this method

[1] *The Decroly Class*, by Amélie Hamaïde (J. M. Dent).

arouses immediate interest by its reading-for-comprehension approach, and that it is in accordance with the view of many psychologists that learning is best acquired by " wholes " (a contribution from the Gestalt hypothesis mentioned in an earlier chapter).

It is interesting to note that the Decroly method establishes association between sentence-form and *meaning* and proceeds by an analytic process to words and to syllables, whereas a phonic method establishes association between letter-form and *sound* and proceeds by a synthetic method to syllables, words, and sentences. At first sight the Decroly method appears to be the natural method. Bright children grasp quickly the association of sentence-form and sentence-meaning. Later they analyse down to word-form and word-meaning, together with sound, and frequently they can with little or no guidance acquire for themselves a syllabic method for the synthesis of new words. The " mechanics " of reading, the slogging at letter sounds, is for them usually unnecessary. Duller children are slower in comprehending meanings of words, either printed or spoken. They do not easily grasp the composite relationship of form, meaning, and sound.

Our experience of these dullest of all children leads us to a view that they make little progress in reading unless they learn by a method that is chiefly phonic. It may be that " wholes " for them are very small, that a sentence or even a word is too large a unit.

Some years ago when children who were newly admitted at ages of 12 + had learned to read before admission by whole word or sentence methods, they were permitted to continue on those lines. None of them ever reached Reading Ages of more than 8–9 years, whereas many children of the same gv level who had learned to read by phonic methods have attained reading ages of 13–14 years. All children now, even if before admission they have acquired some reading technique by other methods, are taught with a phonic method as a basis, supplemented, of course, by other methods. The approach for these children who are young (below 10 years) is now by a form of Decroly method in order to stimulate interest, but later solid work with phonics is found necessary in order to enable them to make much progress.

7. Readers and Books

(a) *Readers.*—There are on the market several excellent readers. The following are well known to us. The New Beacon Readers (Ginn) are on a chiefly phonic method, supplemented by some look-and-say words. The series now has an alternative approach on Decroly lines. In this series great attention is given to the " mechanics " of reading, so that it appears particularly suitable for these dullest of children. In the *Foundations of Reading* (Nelson) stress is laid on picture-matching and phrasing, but phonics and word-building are used when they are really helpful. A feature of these readers is the presentation of subject matter interesting to the modern child—ships, wireless, animals—in simple language.

Reading for Action (Nelson) is a most attractive series, with delightful coloured illustrations and good type. Interesting reading matter is presented in simple words. Older dull children enjoy reading these books.

(b) *Continuous Readers.*—A difficulty many teachers have is to find continuous readers suitable for the less verbal type of child (lower gv levels) that will supplement the Readers used. One problem is to find books that contain reading matter which is suitable in interest for older children but which is presented in simple language suited to their poorer verbal abilities. Another problem is the testing of the comprehension of reading matter. A few of the valuable books of which we have personal knowledge are mentioned here, but our readers who are teachers will naturally want to examine other books of these and other publishers, in order to obtain books suitable to the needs of their particular schemes.

The A. L. Bright Story Readers (Graded I-VI) contain questions on each chapter to test comprehension (Arnold).
New Picture Geography, *The World's Workers, Peoples of the World* (Johnston).
Life in Many Lands (Nisbet).
Joy in Reading Series (Grant).
Heritage of Literature Series (Longmans, Green).
Broadcast Echoes Series (Arnold).
(The last three series are popular choices for the older girls here.)
Modern Stories for the Schoolroom (Oxford University Press). (Appreciated by the most advanced girl readers.)
Story and Study (MacDougall).
The Beacon Literary Readers (Ginn).

Most of these books provide directly or indirectly material for written exercises in English. The Foundations of English, Books I-IV (Nelson), is an excellent English course for Juniors of average gv ability, and for some B Seniors. The instructions and questions in each book enable children to work through them individually—a procedure of " learning rather than of being taught ".

In the present attempt that is being made here to enable these dullest of all children to learn some Geography (see chapter on Geography), Messrs. Ginn's Geography, First Series, Books 1-3, are found useful.

8. English Scheme

(*a*) The New Beacon Readers are used. In mechanical reading word-building exercises and text run concurrently. Work is individual. Exercises are set in oral reading and in silent reading, and comprehension of subject matter is tested from the very beginning.

(*b*) Reading is given an everyday aspect and is made purposeful. The need to acquire the technique of reading in order to carry out assignments of work in Handwork, Domestic Subjects, Needlework, etc., is seen by the children themselves.

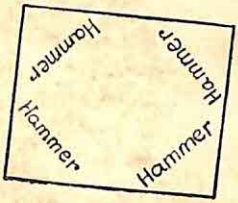
(*c*) *Aids :*

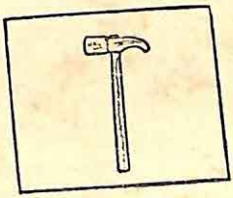
(i) Younger children use Picture and Sentence Matching Cards ; Sentence Cards ; Comprehension Cards—questions which can be answered by sentences found in the reader.

(ii) Word and Picture Matching.

(iii) Cards printed boldly with names of objects in the room are attached to the objects by children who then say the name.

(iv) Snap Games (to set up association between object or picture of object and word-meaning). Example :





There are groups of associated words in each game, *e.g.* " school " objects, clothing, food, garden, etc.

(v) Lotto Games. Three cards, or four, are ruled off into spaces so that each card may contain 12 to 16 different words. Small cards of relatively the same size as the spaces on the big cards are made, containing corresponding words. The child with the small cards calls out a word. The child with the big card containing that word calls " Yes ". (Teacher decides number to count to allow time for recognition—according to skill of children.) The child with the fewest misses when all the cards have been called wins.

(vi) Scrap Books.

(*d*) (i) After working as far as Book III of the Readers (R.A. then 7·5 to 8·5 years) supplementary reading matter is provided, at first in the form of very simple continuous readers, and later increasing in difficulty as progress is made. All children beyond the Reader stage read books for pleasure and for information.

(ii) A daily newspaper (not a picture paper) is supplied to the Senior Boys' and the Senior Girls' classes.
Football papers (6 copies) are given to the boys each week in the season. The girls use knitting patterns.

(iii) There is occasional oral reading to classes by the teacher, and by children who are good readers, of the world's best known stories—to stimulate interest and the desire to read.

(iv) The most advanced girls and boys read some simple History and Geography.

COMPOSITION

Oral

(*a*) Chats on pictures ; on work, play, " everyday " experiences, and other known subjects ; on items of current news (some elder children read newspapers). Children encouraged to talk.

(*b*) Some very easy dramatic work, *e.g.* the doctor visiting a sick girl or boy, a story read by a group of children. First there is spontaneous work, and later the scene is repeated with suggested improvements.

(*c*) Some speech training and correction of defects.

WRITTEN

STAGE (1) : younger children and children generally at a reading stage up to and including Book IV of the Readers : Reading Ages up to about 9 years.

(a) *Group Work—Sentences :*

(i) Simple sentences. One example given on blackboard by teacher ; one example supplied by children and written by teacher on blackboard : these are copied in books. Children then write several sentences (5 to 10) from lists of words.

(ii) Compound sentences using " and ". Procedure as in (i).

(iii) Compound sentences using other joining words, *e.g.* but, because. Procedure as in (i) and (ii).

(b) *Individual Work :*

(i) Matching names. Small boxes containing six to eight common objects—chalk, button, rubber, soap, or small toys mounted on wooden blocks ; small cards, each with the name of one of the objects : arrange appropriately side by side. Write names in book.

(ii) Sentence completion :

1. Fill in missing words in nursery rhymes or in sentences on known subjects, *e.g.* where animals sleep, what different shopkeepers sell, noises made by animals, colours of objects, etc.

Example : The Butcher sells . . . mutton, beef, suet, etc.
The Grocer sells . . . . tea, sugar, cheese, etc.
The Baker sells . . . . bread, cake, tarts, etc.
(in *black* ink) (in *red ink*)

Cards mixed in envelope—child groups—sets out each line ; teacher checks—child writes in book.

2. Further matching : small articles or pieces of material and strips of descriptive cards, *e.g.* " The wool is very soft ". Child arranges—teacher checks—child writes in book.

3. Envelopes containing 3 or 4 pictures and broken sentences to be put together, checked by teacher, written in book by child.

(iii) 1. Picture mounted on card—questions below. Question copied—answer written.
2. Cards each with picture. Sentence to be written about picture. Two types :
i. with words as aid at side and sample sentence given,
ii. with no aids.
3. Envelope containing a picture and several sentences on separate strips of card (to be arranged in sequence and then written in books).
4. Cards with questions to test comprehension of Beacon Reader stories (Books I to IV).

STAGE (2) : children on Books V and VI of the Readers : Reading Ages approximately 9 to 10·5 years.

(a) *Group Work—Single Paragraphs* (i.e. *Sentences in Sequence*) *:*

Paragraphs to be indented half a line and in the first place efforts made to make paragraphs of about half a page in length.

(i) A subject is set, *e.g.* the Garden. The paragraph is produced sentence by sentence orally by the class and written on blackboard by the teacher. It is then copied by the children in the group into their books (note spelling). Another familiar subject is then set and the children compose individually, and *each* writes a paragraph.
(ii) Five or six subjects are set. The children choose two or three from these, and write a paragraph about each. This exercise is repeated several times with new subjects, according to needs of individual children.
(iii) Describe in a paragraph someone or something, and leave to reader to guess, asking " Who is it ? " or " What is it ? "

(b) *Individual Work :*

(i) Cards with questions to test comprehension of stories in Beacon Readers, Books V and VI.
(ii) Cards with pictures and questions requiring answers to be written in a paragraph.
(iii) A series of pictures on cards and a story broken into

sections also on cards. Pictures and story to be arranged in sequence and copied.

(iv) Numbered sequence picture cards. A paragraph to be written about each picture, the whole making a story.

STAGE (3) : Reading Ages above 10·5 years.

(a) *Group Work—Series of Paragraphs* (i.e. *Paragraphs in Sequence*) :

(i) A subject for a story is set (*e.g.* the Park). Whole group works out *list* of paragraphs (orally) ; written on blackboard by teacher. Children individually write a story on this framework.

(ii) A short story is read to the children. List of paragraphs —at least 5 and usually not more than 7—is written on blackboard by teacher. Children write story from this.

(iii) A short story is read to the children. Children make lists of own paragraphs on rough paper. Lists checked by teacher, and then story written by children.

(iv) A story is written by the children from a given outline, *e.g.* night—town—jeweller's shop—burglar—policeman.

(v) Children read own short stories—make list of paragraphs—write stories (History or Geography or general).

(vi) Whole group write " stories " (or letters) from given subjects, *always* writing out lists of paragraphs before beginning to write stories or letters.

(b) *Individual Work :*

(i) 1. Sequence picture cards arranged in order and story written.

2. Given picture about which a complete story is to be written.

3. Cards for correcting simple grammatical errors, *e.g.* " Put correct words in spaces—as, is, his, has. The boy . . . lost . . . dog. The table . . . made of wood."

4. Given words, meanings to be supplied by children, who then write sentences using these words.

5. Exercises dealing with :

describing	words	—short, bright
how	,,	—sharply, quickly
when	,,	—now, then
naming	,,	—shop, street
doing	,,	—run, jump

6. Given meanings and first letters of words—supply words : *e.g.* A loud sharp cry —s . . . People living near —n . . .

7. Exercises with words, *e.g.* plurals—"y" into "i" and add "es". Silent "b" after "m"—"comb", "climb", etc.

(ii) 1. *Girls* (to induce ready flow of words). Cards to test : (*a*) clarity in planning work in Housewifery, (*b*) sequences and procedure in Laundry processes, (*c*) general application of thought to Needlework, (*d*) knowledge and planning in Cookery.

2. *Boys* (to test sequence of thought and to induce ready flow of words). Cards for Woodwork, Handwork, Cobbling, Games, etc.

(iii) *Special groups* (*brightest boys and girls*) : Possibilities of written work in History and Geography. (See Reading —for information.)

WRITING

Print writing is taught to younger children (one "language"). Some children later join letters and develop cursive style. Children who have a cursive style on admission are allowed to continue this.

9. Individual Records—Reading

Of children's work in Reading each class teacher keeps records in a loose-leaf exercise-book. At the front is a register of names ruled down in narrow columns. At the top of each column the date is inserted and a tick is placed opposite the name of each child whose work is tested. The teacher after testing may require further work to be done on the portion or may give a new assignment of work.

In the loose-leaf book a page is allocated for each child and ruled in four columns—Date, Word-Building Exercises, Reading

Matter, Observations. A section of work in the Beacon Readers consists of both a word-building exercise and a portion of reading matter.

10. Examples of Exercises in English Composition

(*a*) In an envelope are placed a series of pictures (in this case numbered 1 to 4) and this card :

> This is a story about children at the seaside. Look at the pictures, put them in order, and then see if you can write a story telling how the boy and girl became friends with the baby.
>
> Write one paragraph for each picture.

(*b*) In an envelope are placed a series of pictures (in this case 7 pictures not numbered) and this card :

> Write the story of how the fox goes hunting.
>
> Put the pictures in the right order first.

(*c*) (For girls.) English applied to Domestic Subjects :

(i)

> Picture of sponge pudding with jam
>
> What is the pudding called ?
>
> Write three paragraphs stating :
>
> (*a*) The recipe.
>
> (*b*) The method of cooking this.
>
> (*c*) How you can vary this foundation recipe to make different puddings.

(ii)

> Picture of dish of boiled beef, dumplings, and carrots
>
> Describe in detail the preparation of this meal. Make a list of paragraphs, and show these first.

(iii)

Attractive coloured picture of a bedroom	Write one paragraph answering each of the following : 1. What would you do with the counterpane when giving the room a weekly clean ? 2. How would you clean the carpet ? 3. How would you clean the mirror ? 4. How would you clean the brushes on the dressing table ?

(iv)

Attractive coloured picture of a dining-room	Describe the method of work for the daily cleaning of this room. First make a list of paragraphs and show these.

(v) Pictures from catalogues, *e.g.* of clothing, with questions requiring paragraphs about method of laundering.

(*d*) (i) Question cards are used in conjunction with some books. Sometimes these are answered briefly by children in small rough note-books, the purpose of the exercise being to test the comprehension of the reading matter rather than the power of written expression.

(ii) Reproduction of a story read earlier in the week.

(*e*) Cuttings of paragraphs or articles from newspapers or periodicals are mounted on a card (usually folded).

A series of questions on the subject matter is typed on the other side of the card. In some of these folders pictures are mounted and information is supplied for children to study before answering the questions in writing. Sources of paragraphs and articles are : the daily newspapers and the local weekly newspapers, the children's newspaper, children's pages from magazines, pages from *The Teachers' World*, *Child Education*, and *The Schoolmaster*, pictures and information (typed) from books, extracts from *What's in the News ?* (Dent).

Typical sets of such cards are : the seasons in many lands, the world's workers, the world's carriers, famous names in history, nature stories, English through famous stories.

Chapter XVI

NUMBER AND MATHEMATICS

1. Limitations of the Dull

The attainments in Number and Mathematics that are possible for individual children depend largely on their individual gv abilities. The work done by feeble-minded children in the subject is vastly inferior to the work of children of middle gv ability, and indeed markedly inferior even to that of children who are of average C class levels. Dr. Cyril Burt in his lectures has stated that children with I.Q.s of below 70 generally do not use multiplication tables. They multiply by addition. It is quite true that some of them can and do learn the multiplication tables, but that is a different matter from using them. Our experience with such children supports Dr. Burt's statement.

A scheme for Number Work for feeble-minded children such as the one in use at Lankhills would be of little value to teachers in Senior Schools even for C classes unless the lines of extension could be clearly shown. In a C class there is a much wider spread of gv ability than there is in a B or A class, owing to the tailing-off or " scatter " at the lower end of the intelligence range. Because of this the Number Work in a C class will usually be done by groups, or possibly individually. If the C class is divided into three groups the highest group will be the largest, and the lowest—with the greatest scatter—the smallest. The Lankhills scheme will be found suitable for only the lowest group. The other C children have abilities that will enable them to proceed beyond the limits of this scheme.

2. gF Approach and gF Application

For all dull children—for C children—Number Work must be on practical and everyday lines in terms of realities. Dr. Alexander in *The Educational Needs of Democracy* says :

> Is it reasonable to suggest that the boy with a fair amount of g and of F may, in fact, be taught what are normally thought of as academic subjects

without the use of words, or at least with only such limited use of words as he is able to manage? I believe that the greatest contribution to education at the moment would be the development of what I call F methods, which would enable those pupils who lack v but who have F to make their g manifest by an F approach. Let us consider this in the sphere of mathematics. To prove that the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides, we may employ two methods, one verbal and the other practical. For verbal pupils the appropriate method will be the extension of the necessary lines and the completion of the necessary diagrams which enable comparison of triangles to be carried out. I am not suggesting that this proof is not completely adequate. I am suggesting that it would be equally adequate for practical pupils to cut out the appropriate areas and match them one to the other, thus coming to the same conclusion without the use of words. I have often wondered whether any really good mathematician ever uses words in solving a mathematical problem. It is obvious that he must use words in telling other people about it, but it is one thing to solve a problem and another thing to tell people how it is done.

Our view is that not only for C children, but for B and A children too, Number Work and Mathematics should have a gF approach and a gF application of the abstract processes that are learned. In the Assignment of Work given at the end of the chapter on Rural Science are two problems in Mathematics which illustrate approach and application. The first is: "Make a square prism and a square pyramid in cardboard, base of 1" sides, vertical height 2". Compare volumes." This is an *approach*. The purpose is to establish the formula for the volume of the square pyramid, *i.e.* to acquire a new piece of mathematical knowledge. The formula for finding the volume of the square prism was already known. By making the two models, and by using sand to compare volumes, it will be found that the volume of the square pyramid is one-third that of a square prism of the same base, and vertical height. The formula $v = \frac{1}{3}bh$ would thus be established. This is a new piece of knowledge to be acquired by an experience and by educing a relation (Spearman's theory). The experience and relation are both concrete, *i.e.* the approach is of gF type. The second problem is: "Find the weight of iron piping that carries the sprays in the lavatory (one side only)". This is an *application*. It should be explained that replacements were being effected, and the problem was of some everyday importance because weight for horse transport was sought. There

was a choice of two methods of solution : (*a*) by measurement of external and internal diameters with callipers and then measurement of the length of piping ; by applying the knowledge of volumes of cylinders (already known) and subtracting the inner volume from the outer, so obtaining the volume of the iron ; then by the use of the volume-weight ratio of iron, ascertaining the weight ; (*b*) by weighing a piece of the iron piping of known length, and then, after measuring the total length of piping, finding the weight by ratio (an application of an abstract process). This problem is not one in which a new piece of mathematical knowledge will be acquired, although a new fact will be ascertained. It is not an *approach*. It is an *application* of known theories—a gF application.

3. Time spent on Number Work

A vast amount of valuable school time is spent on Number Work and Mathematics. Mr. F. F. Potter once remarked that in the two years between the ages of 10 and 12 a child of average ability could learn all the arithmetic there is. He did not mean that no calculation should be done before 10 years, but that formal paper work before that age could be largely dispensed with. The importance of his remark is that it gives rise to the thought that much time may be wasted by introducing a child to processes at too early an age. " Arithmetic " consists only of the four rules simple and compound, fractions and percentages. Much investigation is needed to tell us the optimum ages for the introduction of the various processes.

4. The Need for Practical Applications

Unless the processes that we attempt to teach children are applied by the children themselves in some way to the practical things of everyday life, they tend to become only facts to be stored instead of real knowledge. In the schemes that follow, some attempt has been made to show practical applications of processes.

5. Lankhills Scheme of Work for Feeble-minded Children

I (i) Number names : counting objects. Number symbols. Practice with objects $6+3$, $7-2$, etc. to 12.

(ii) Shopping games and recognition of written prices to 6d. (Pence and half-pence.)
(iii) Sorting shells (beads, etc.) into number groups, *e.g.* groups of four, or having boxes with groups of objects to find total.
(iv) Playing with scales : 1 lb., ½ lb., ¼ lb.
(v) Matching lengths : coloured strips of card, and a big card containing a number of lengths.
(vi) Toy clock, hours only.
(vii) Playing cards (made by teacher) : number in corner, and groups of dots associated.

II (i) Notation to 20 (number rods or bead bars).
(ii) Addition and subtraction—only two numbers in addition. Use of as long as necessary.
(iii) Scoring games.
(iv) Recognition of ½d. Shopping to 1s. first without, then with, ½d.
(v) Clock : learning half-hours, then quarter-hours, by position.
(vi) Two and three times tables, by groups.
(vii) Weighing and use of capacity measure. Note use of cup. Use of ruler : inches (necessary for pattern-making).
(viii) Lists of numbers of objects, *e.g.* stock-taking.

III (i) Notation and numbers to 50.
(ii) Money to 2s., 2s. 6d., 5s. Practical and shopping.
(iii) Addition of more than two quantities and teaching of carrying.
(iv) Subtraction by equal addition.
(v) Tables (group work). Use of tables in random order—1, 2, 3 ; 2, 4, 6 ; 3, 6, 9 ; 4, 8, 12.
(vi) Teaching of fractions ½, ¼, ⅓, cards.
(vii) Use of ruler as straight-edge ; then make in paper, 1 yard folding into feet. Use paper in 1″ squares. Cut, paste. Make 1 foot.
(viii) Clock : hours, quarters, 5 min. to and 5 min. past.

IV (i) Notation to 100.
(ii) Addition and subtraction of money (rarely more than £1).
(iii) Oral to 50 and 5s.
(iv) Games for speed. Boys to make own sums.
(v) Shopping and change to 10s.
(vi) Arrangement of groups of money, and completion.
(vii) Easy invoices. Stamps.
(viii) Paper work and rulers ; simple fractions.
(ix) Indoor and outdoor measurements. Use of paces, yard stick, foot-rule. Estimation of measurement, then check (*e.g.* plot, path, length or height of room, size of window). Simple plans and elevations to scale (squared paper). Measurement of pints and quarts.
(x) The clock. Tell time. Exercises imaginary fast or slow.

V (i) Revision of multiplication tables.
(ii) Four rules.
(iii) Money to £5.
(iv) Invoices.

(v) Proportion—unitary method.
(vi) Practical work with fractions to $\frac{1}{8}$ and $\frac{1}{12}$ (including $\frac{1}{3}$ and $\frac{2}{3}$).
(vii) Household arithmetic : spending wages. Trade problems. Savings Certificates, P.O. Savings Bank.
(viii) *Boys* (see scheme in Paper and Cardboard Work) :

OUTDOOR MEASUREMENT : use of yards and feet. Use of chain.

1. Measurement of plots in garden—drawing to scale and inserting dropping plan to scale.
2. Outbuildings, gates, doors, windows, etc. Simple plans and elevations to scale. Developments and models (decorated as original).

INDOOR MEASUREMENT : use of feet and inches, and inches as fractions of foot. Plans and elevations : mirror, picture, cupboards, chests, windows, etc. Developments of cupboards, etc., to scale. Estimations of lengths : outdoor, indoor, check.

1. Making cardboard models to scale from description.
2. Use of map of county : measurement of distances. Use of scale.

Girls (see scheme in Needlework) :

1. Needlework :
   Quantities and prices of materials to make garments for children of various ages, and simple soft furnishing items. Measurement used in pattern-making and adapting.
2. Cookery :
   Working out costs of whole meals from recipe books and price lists.

(ix) Tons and cwts. Simple exercises on fuel supply.
(x) Simple graphs : temperatures day to day.
(vi) Use of railway and bus time-tables. Work out times of arrival at certain Hampshire towns and villages, given the starting place and time of starting.

Notes

Work generally is on " concrete ", applied, and practical lines rather than on abstract lines. Numbers dealt with are small, and exercises are of the " everyday " type.

Sets of cards made by the teacher, covering the course, will be found helpful. Some of these cards can be illustrated with cuttings from catalogues.

Method of Recording Individual Work, to secure Continuity.—On the front cover of each child's exercise-book is affixed a small square of coloured gummed paper to indicate the section of the scheme on which the child is working. There is a distinctive colour for each section : I, yellow ; II, black ; III, purple ; IV, green ; V, red. Sets of cards (assignments of work) have been prepared by the teachers to cover the whole scheme. At

a top corner of every card is a small coloured square indicating the section, a letter (a), (b), (c) indicating the subsection, and a number indicating the sequence of the card in the subsection. The cards are filed in boxes. After finishing one card, a child helps himself to the next. The colours assist selection and filing.

Each teacher keeps a loose-leaf book with each child's record on a separate page. The pages have columns for date, scheme number (*e.g.* III f), card number. When a child passes to a higher class the record on the loose leaf passes to that class too.

6. Attainments of Lankhills Children

The 91 children in the school (beginning of term, vacancies not all filled) are at present working at the following stages of the scheme :

Stage	Number of Children
I	13
II	7
III	32
IV	25
V	14

7. Examples of Cards (Assignments of Work)

(Number refers to section and subsection of scheme)

(a) *From elder girls' class, Section IV :*

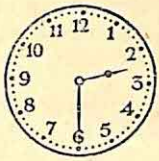
CARD IV.e.9

(Labelled pictures of objects gummed to top of card)

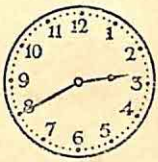
Vase 2/6	Bowl 3/3
Dessert Bowl 4/11	Ash Tray 1/11

1. Buy a dessert bowl and 2 ash trays. What change from 10/- ?
2. I have 7/6. I buy a vase and a bowl. How much change shall I have ?
3. Buy a vase, an ash tray, and 2 bowls. How much will you spend ?
4. Buy one of each article. How much more than 10/- do you spend ?

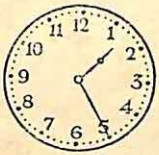
CARD IV.j.4



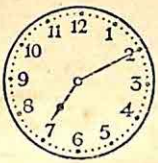
1. A cake goes into the oven at this time. It takes twenty minutes to cook. When will it be done?



2. Sausages are put in the oven at this time. They must cook for half an hour. When will they be ready?



3. I reach the station at this time. My train leaves in a quarter of an hour. At what time does it leave?



4. Father leaves home at this time. It takes him five and twenty minutes to get to work. At what time will he get there?

CARD IV.j.6 (to work without clocks—more abstract process)

1. How many minutes in 1 hour?
2. A cake has to cook for 20 minutes. It goes in the oven at 2.55 : when will it be done?
3. If it takes 10 minutes for potatoes to come to the boil, and they have to boil for 20 minutes, what time must they be put on for 1 o'clock dinner?
4. A joint of beef weighs 4½ lb. I have to allow 20 minutes cooking for each pound, and 20 minutes over. How long must I cook the beef?
5. I have 5 lb. ham. It has to boil 20 minutes for each lb., and 20 minutes extra. How long will it take to cook? If it starts to boil at 9 o'clock, when will it be done?
6. A cake has to cook 2½ hours. It goes in the oven at 1.15. When is it cooked?

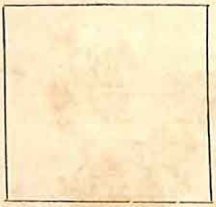
(b) *From elder girls' class, Section V :*

CARD V.g.4

A girl earns £3 a month at a " live in " job. Show, on a bill, how much she will spend, and what she has to pay out. This list may help you :

Savings Bank
New vests and knickers (2 sets)
Soap, toothpaste
Face cream
Bus fares (for half days)
Pictures
Keep Fit, or Girls' Club
Sweets, fruit
Gloves
Stockings

CARD V.h.6. (A piece of material is fixed to one corner of the card. It can be identified—name, widths, price, etc.—by searching in a book compiled by the teacher, in which patterns of every kind of fabric are mounted and full details of widths, prices, etc., are given.)

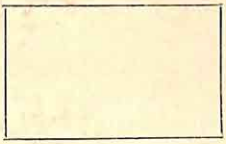


1. Find the cost per yard of the material.

   For a 16-year-old girl,
   a frock needs 3¼ yards,
   an overall with sleeves needs 3¾ yards,
   a pinafore needs a yard and a quarter.

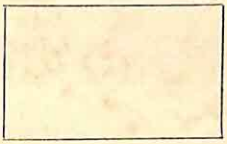
1. How much print will be needed for a frock and a pinafore? What will it cost?
2. How much will be needed for 2 overalls? What will they cost?

CARD V.h.19. (Two mounted coloured pictures of meals, cut from *Family Meals and Caterings*, are gummed on this card.)



Saturday

Savoury Pudding and Gravy
Parsnips
Chocolate Custard
Melted Cheese on Toast



Friday

Minced Meat Roly and Brown Sauce
Potatoes, Celery
Rusks and Jam
Fried Herrings
Bread and Milk

Find the recipes for these meals.

Using them, and the price list at the back of the book, work 2 bills giving the cost of each day's food.

(c) *From elder boys' class :*

CARD V.k.41 *Extract from Time-table*

	A.M.	A.M.	A.M.	A	A.M.	A.M.	P
				A.M.			A.M.
London, Waterloo dep.	5.40	6.0	6.27	7.27	8.30	9.30	10.30
Southampton Ter. arr.	..	8.44	9.20	10.17	..	..	..
,, Cen. ,,	7.48	8.52	9.33	10.22	10.25	11.24	11.57

	A.M.	P.M.	P.M.	P.M.	P.M.	P.M.
London, Waterloo dep.	11.30	12.30	1.30	2.30	3.30	4.45
Southampton Ter. arr.	..	..	..	..	..	..
,, Cen. ,,	1.17	1.58	3.15	3.58	5.17	6.16

	P.M.	P.M.	P.M.	P.M.	P.M.
London, Waterloo dep.	5.30	6.30	7.30	7.54	10.30
Southampton Ter. arr.	..	..	..	10.43	12.53
,, Cen. ,,	7.19	7.58	9.28	10.58	..

A—Via Alresford and Alton. P—*The Bournemouth Belle*, Pullman Cars only ; Supplementary fares charged.

1. You get to the station at 8 A.M. What train will you catch from London ? How long will the journey take ? How long have you to wait for it ?
2. Which is the quickest train in the day ? How long does that take ?
3. Which is *The Bournemouth Belle* ? How long does she take ?
4. You leave work at 4 P.M. and travel by bus for 20 min. to the station. What train will you catch to Southampton ?

   If you miss the first train, how long have you to wait for the next ? How much later will you be getting home ?

V. Revision Card

A coloured picture cut from a catalogue of an Austin Seven car is mounted here.

Prices at works :
Fixed Head, £137
Sliding Head, £139

1. A man saved £10 a month. How many months did he save before he could buy the sliding-head car ?
2. This car travels 45 miles to the gallon. If a man spent 6/4 on petrol at 1/7 a gallon, how far could he go ?
3. Draw 3 views of a lean-to garage, 8′ high where it joins the house, 6′ at the other side, 12′ long and 7′ wide.
4. A man left home at 9 o'clock in the morning and reached the next town at 10.15. If he travelled at 40 miles per hour, how far did he go ?
5. A man travelled 70 miles at 30 m.p.h. If he left home at 12.30, what time was he at the other end of his journey ?
6. The speedometer read 1372 when I started this morning. Now it reads 1535. How far have I been ? If I can go 40 miles with 1 gallon of petrol, how much did I use ?

Some revision cards are based on a series of coloured pictures showing parts of rooms with attractive modern furnishings, and mounted on the cards (dining-room, lounges—several, bedroom, bathroom).

8. Extension of Scheme

(*a*) It will be noted that in Section V of this scheme some of the content is planned for both boys and girls, but that some is for boys only and some for girls only. Their different interests, and the different applications in after-school life that they will make of their knowledge, have been considered. In extending the Scheme for brighter children sex differences in natural interests might well be kept in mind.

(*b*) For brighter children much can be done in the way of a gF application and something in the way of a gF approach.

(*c*) One way in which there can be a gF application is by the use of instruments of measurement. Boys in particular are interested in working with such instruments ; some girls too may be interested. Altimeters for measuring heights, sight rules for simple survey work, water-levels for finding gradients

and contouring maps, anemometers for measuring wind speeds, can all be made in the practical rooms of the Senior School. Prismatic compasses for more advanced and accurate survey work by brighter children could be purchased for a few shillings in pre-war days. Callipers for measuring internal and external diameters can be made if a metalwork room is available, and if not can be bought cheaply.

The following notes on some of the instruments may be found helpful :

ALTIMETER

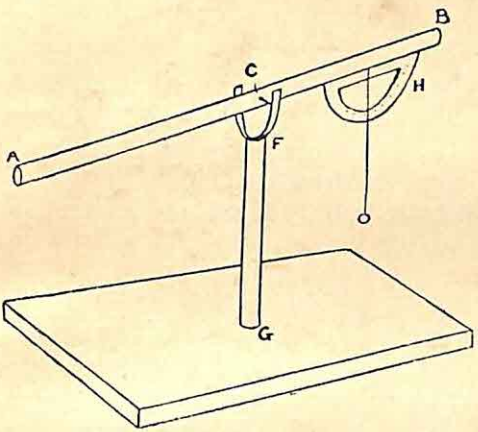


FIG. 1

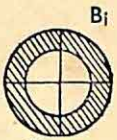


FIG. 2

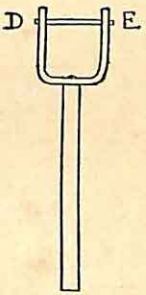


FIG. 3

CONSTRUCTION

Can be made by boys in practical instruction room. The outer casing, AB, could consist of an old bicycle inflator. A hole is bored through at C (of larger diameter than the swivel pin DE, so as to give free movement in a vertical plane).

FG is a piece of brass (or iron) rod and the piece DFE (Fig. 3) is of stout sheet brass made to swivel at F in a horizontal plane.

H is an ordinary metal protractor soldered to the barrel. A plumb-line (black cotton and weight) is fastened to the zero point. The wooden base is best made of hard wood and can be stained and french-polished. B_1 is the end of B enlarged. Two crossed wires give a fore-sight.

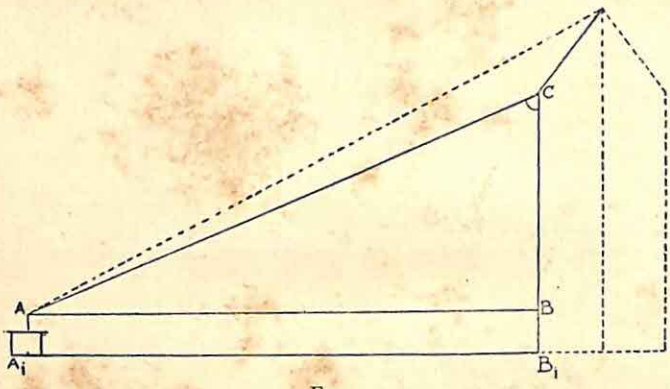


FIG. 4

METHOD OF USING

To measure vertical heights that are inaccessible : A_1B_1 is a measured base line. The reading on the protractor is the angle at C. The angle at A is the complement of this (90°–ACB). By setting out to scale and using a protractor, vertical heights can be found.

EXAMPLES OF EXERCISES

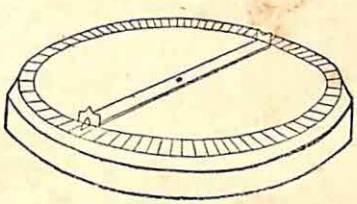
From the Handwork scheme in this book it will be seen that Lankhills children make models of buildings to scale. All heights are found by actual measurement with measuring poles. Brighter children (some of Cs and all of Bs) if they were making similar models could use the altimeter to find heights. Still brighter children could find heights by using the altimeter, and then instead of drawing out a diagram to scale as in the illustration in order to calculate the height, they could apply their knowledge of trigonometry (solution of triangles). Thus exercises can be planned for children of different intellectual levels.

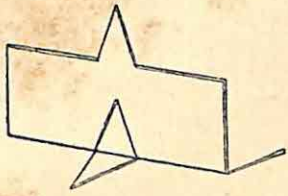
SIGHT-RULE

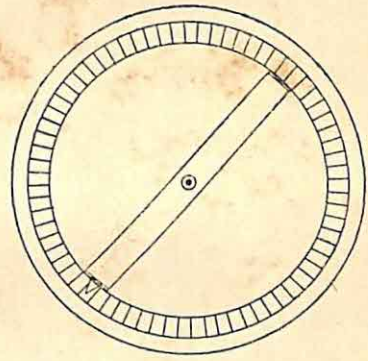
A sight-rule made from a strip of brass with a fore-sight and a back-sight and an accurately marked base will give good results. (Etched marks on a round brass plate mounted on a hardwood base, or marks scratched on the hardwood base itself.)

The rule is screwed to the centre of the base with a washer below and a washer above, so as to leave the rule free to move.

Alternatively for the sights slots can be cut and vertical wires fixed to form fore-sight and back-sight.





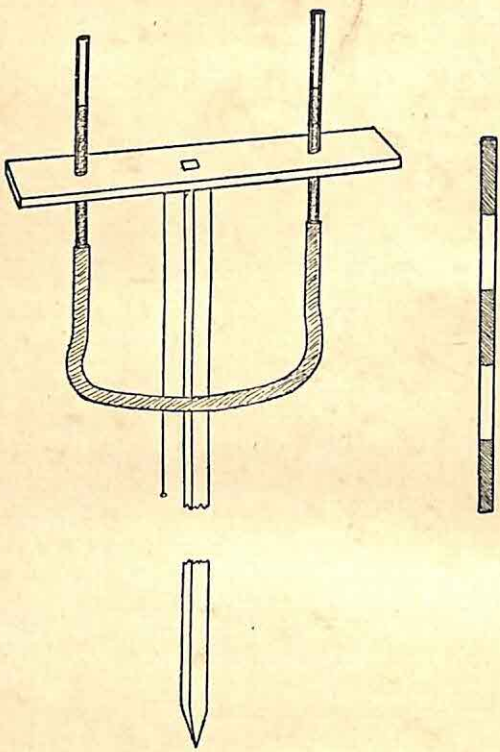


EXAMPLES OF EXERCISES

The sight-rule is used in conjunction with a chain for surveying. The survey may be a boundary survey, or one made by a base-line method. The simplest survey is a boundary survey of a playground or a field. A stand or a plane-table on which the sight-rule rests is set up in a corner of a field. The angle of that corner is measured by taking two bearings on poles held at the two adjacent corners of the field. The two sides are then measured with a chain. The sight-rule is set up in each of the other corners and a similar procedure is followed. The data are recorded in figures, and a plan to scale of the field can then be drawn in the classroom. To survey the same field by a base-line method, bearings on each of the corners are taken from two points in the field. The points are fixed a good distance apart to give a long base-line, and the distance between the points is measured. A stretch of road with the adjoining land can be surveyed by a traversing, by taking a series of new points along the road (always a point where the road deviates) and from each point taking bearings on various features on each side of the road—houses, woods, etc. Bearings on any feature must of course be taken from two points, in order to find position by the intersection of the bearings. Mapping a small area around cross-roads is an interesting exercise. Children of B level of intellect, and some of C level, are capable of this work. A children are capable of

using a prismatic compass instead of a sight-rule to make their surveys. In the chapter "The Bases" there is mention of a survey made by an A class of an area of moorland. About eight miles of surrounding roads were surveyed, and the moor itself, an area of rather more than a square mile, was mapped in detail.

WATER LEVEL



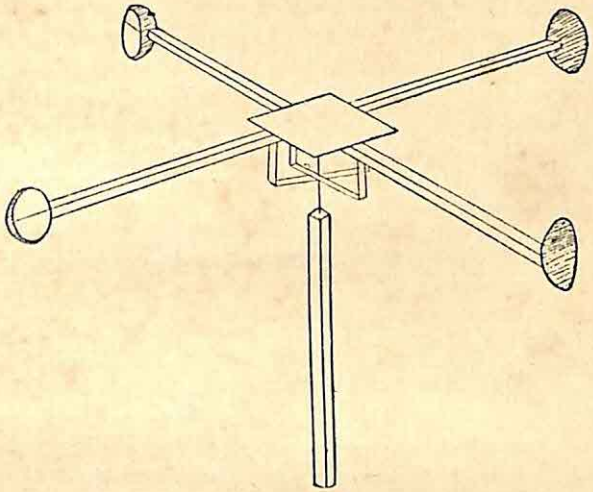
CONSTRUCTION

Wooden post with board; glass tubes; rubber tubing; coloured water; plumb lines; measuring poles (broomsticks, tall).

USE

For finding gradients and contouring plans. The use of this instrument seems so obvious that no examples of exercises are given.

ANEMOMETER



Construction

The four arms are made from two pieces of wood, 1″ × 1″, half-lapped joint. On top, piece of stout tin plate ; underneath, two strips of thinner tin plate. The cups can be made either of paper pulp or of gummed strips shaped on a cricket ball. Three cups are black and one white—or *vice versa*. The rod has a stout long nail embedded point upward.

Use

To find wind speeds. (Application of the mathematics of the Circle.)

Examples of Exercises

(*a*) Single exercises can be set to find wind speeds by using an anemometer. With the anemometer held high the number of revolutions per minute can be found and checked by two or three counts, by two boys. The length of the revolving rod from cup to cup is the diameter of the circle described by a cup in a complete revolution. The formula for finding the length of the circumference is applied. The number of feet per minute can then be expressed in terms of miles per hour.

(*b*) An interesting exercise for a bright child is to prepare a graph for a particular anemometer that will translate revolutions per minute into miles per hour. If several anemometers each with arms of different lengths are provided, the exercise of preparing a graph may be repeated for each anemometer.

(*c*) Younger children and duller children can make and record methodical observations of wind speeds by using an anemometer and a graph. If several instruments are used it is advisable to number them and to put corresponding numbers on the graphs.

Girls may not be so interested as boys in using the measuring instruments described above, but girls as well as boys will be interested in recording weather observations. Daily readings of thermometers (maximum and minimum, wet and dry bulb), barometer, rain-gauge, and weather-vane can be made by children detailed on a rota. If the children draw graphs of the readings each month, they have the opportunity of tracing relationships among the readings.

For girls, household problems in (*a*) furnishing measurements and prices of carpets and curtains, (*b*) clothing measurements, sizes (note pattern drafting in Needlework scheme), (*c*) food, (*d*) wages, and (*e*) savings afford possibilities in the way of gF applications of number work.

A scheme for boys that has been used successfully with a top A class is appended. It was drafted nearly twenty years ago. The notes "Note gF approach", "Note gF application" have been added for the purpose of this book. Dr. Alexander's research now enables us to epitomise the description of methods in these terms.

(*a*) The gap between the Lankhills scheme and this scheme will readily be filled in by teachers in order to plan schemes for C and B children.

(*b*) Our experience does not extend to brighter girls, and as only the products of practical experience are given in this book, no scheme for brighter girls is given.

MATHEMATICAL SCHEME

Top A Class (Average Mental Age, 13–14 Years)

With a gF approach and a gF application.

(a) *Arithmetic :*

(i) *Money :* compound interest ; insurance and endowment insurance ; other investments ; examination of share issues announced in newspapers. Bills of exchange ; rates of exchange ; income tax (filling in returns and working out) ; rates. Use of ready reckoner, railway guides, and Whitaker.

(ii) *Measurement :*

1. Length—perimeter of plane figures—application to fencing. Use of surveyor's chain. Square Root.
2. Area—plane figures—any shape—application to fields, etc. Use of squared paper. (Note gF approach.)
3. Volume : (*a*) prisms ; (*b*) pyramids—cones, etc. Make developments of above in paper. Establish formulae for volumes. (Note gF approach.)

(b) *Practical Mathematics :*

(i) 1. The measurement and drawing to scale of fields (any shape) :
(*a*) base-line method } using prismatic compass, poles and chain.
(*b*) " closed " method }
Note.—Expression of areas in sq. chains, acres and decimals of acre, square yards.

2. Road survey of (say) a half mile of road (contoured) using prismatic compass, chain, and water-level.
3. Class survey of a piece of country, moorland or fields or park : (*a*) geographical (mathematical), (*b*) geological, (*c*) botanical.
4. Surveys of small local farms (group work).

(ii) 1. Exercises on water supply : use of callipers ; speed of flow into tanks.
2. Heights of buildings ; altitudes of sun, etc., using altimeter.
3. Wind speeds (using anemometer) ; application of mensuration of circle.
Graphs to change revs. p.m. to m.p.h.
4. Statistical graphs : weather, economic geography (use of Whitaker), etc.
5. Drawings and isometric and orthographic projection.
Note.—(*a*) Buildings to scale (heights, using altimeter, sloping base lines using water-level). (*b*) Linking with manual training work.

(c) *Algebra :* Simple equations, and problems based on these. Simultaneous equations.

Chapter XVII

HISTORY AND GEOGRAPHY

1. History

History to a greater degree than most school subjects tends to be academic and taught through the medium of words. It is often a study of the development of thoughts in men's minds ; of movements arising from these thoughts ; of complex abstract relationships that are constantly changing as these movements grow. It is quite obvious that the study of History on these lines is far beyond the intellectual capacity of any children but the brightest. The study of political history, or even of citizenship, except in so far as it can be applied to everyday life as the child knows it, entails a grasp of abstract concepts that seem to be certainly beyond the understanding of children who are below middle gv ability.

It appears desirable that all children as they grow up should know something of the people of other times, and that they should have a background against which to view their present circumstances. The criterion in education must be, however, not " What should we teach ? " but " What are these children capable of learning ? " So in considering duller children the question is not just " Should they learn History ? " but " Are any of them capable of learning History, and if so which of them ? "

This book stresses gF methods. Is a gF approach to History possible and can a gF application be made ? We shall attempt to answer these questions.

Our own personal experience is limited and our findings are not conclusive, but the problems have been approached in a spirit of inquiry and the findings are given for what they are worth.

(a) *Feeble-minded Children.*—(The group considered has a Mean I.Q. 66 ; Range 54–74.) Our view is that these children are *not* capable of learning History and that formal lessons for them in History are a waste of time.

We know no Special (M.D.) School in which History as such appears on the time-table. On four occasions in the past twelve years History has been included in the curriculum at Lankhills. After trials for periods ranging from six to eighteen months, the attempts to teach History have been abandoned. All the experience we had in using practical methods, of planning visual and concrete exercises, and of using everyday surroundings, was brought to bear on this subject. And what surroundings they were ! To teach History in Winchester must surely be the dream of any enthusiastic teacher. There is such wealth of historical associations, and such material in the way of historical buildings, ecclesiastical, educational, and domestic. Roman coins and Samian ware are unearthed from time to time in the school garden. A skeleton of a man seven feet tall, also unearthed in the school garden, was thought by a local archaeologist to be Norman. The garden next door was a Roman cemetery. There is in the town a good museum.

Despite the facilities, the experience, and the enthusiasm, the attempt to teach History was a failure. The children confused times, events, buildings, and life at one time with life at another. The simplest forms of time charts were used and life at every stage was linked with life as these children know it, by comparing and contrasting. No real knowledge was acquired. There is now no organised teaching of History at Lankhills, but there is some incidental teaching. The discovery in the garden of half a wool-staple (there is a street called Staple Gardens in the town), and of Roman coins, has provided centres of interest, and has made visits to the museum purposeful. Municipal elections, the dust-cart, the police, a new form of street lighting, and the schools have formed the basis of very simple lessons in Citizenship.

(b) *Children Dull in Less Degree* (*i.e.* of C class level, I.Q.s 75+).—It will be understood that the failure of feeble-minded children to learn History does not constitute an argument against including this subject in the curriculum for C class children in Senior Schools. In any C class only the poorest gv children—about 4 or 5 in number—are at the gv level of the Lankhills children.

Our view is that children who are dull in less degree (*i.e.*

children with I.Q.s above 75 or so, constituting the great majority of children in a C class) *are* capable of learning History of a kind provided certain methods are used. We should to-day call these gF methods.

Our experience with children of this level came earlier than the experience with feeble-minded children. Dull children generally are interested in things and conditions having a bearing on their own everyday lives. They learn by seeing and by doing more readily than by hearing, but they are interested in the personal, in stories of people, more especially in stories of action.

With these points in mind, a scheme for younger children was drafted. It consisted of stories of outstanding figures in history, not " lives ", but achievements and incidents. Time charts were fixed round the room and used in each lesson. Pictures and models were used, and the children made drawings and models of simple construction. For older dull children a scheme in Social History was drafted. They also used time charts and they made models of a three-field system, of a Norman castle, of early and later manor-houses, of vessels and weapons. At every stage the lives of the people and especially of the children of the time were linked up with the everyday lives of the children in this class. Housing, food, dress, work, recreation, and transport were considered comparatively. These older children seemed really interested and the work appeared to meet with some measure of success. The children failed to learn much from their own reading, but they appeared to get something from the short oral lessons in which pictures and models were used, and which were followed by their own exercises in drawing and handwork.

One of the difficulties at the time this work was done was the finding of sources of information by a teacher who knew little history. The Quennells' *History of Everyday Things in England* [1] (since published) is a mine of information. Professor Drummond's book, *An Englishman's Food—a History of Five Centuries of English Diet* [2] is interesting not only to students of

[1] *A History of Everyday Things in England*, by Marjorie and C. H. B. Quennell (Batsford), Vols. I to IV.

[2] *An Englishman's Food—a History of Five Centuries of English Diet*, by J. C. Drummond and Ann Wilbraham (Jonathan Cape).

History and Dietetics but to ordinary people who like good food.

(c) *Children of Middle gv Ability and Just Above.*—The view of many thoughtful teachers is that Senior School children, even of A level, acquire little real knowledge of History. We have heard it stated many times that by the time they are 15 years old, children who leave school at 14 years of age have forgotten any History they may have known. Some teachers attribute this to their leaving school at too early an age, and to an overcrowded curriculum with perhaps only one half-hour a week given to History. There certainly is a strong case for continuing every child's education to 16 or even to 18 years of age, and it may be that a case can be stated against an overcrowded curriculum, but we do not believe that these are the primary reasons for failure to learn History. Is it not rather that the History has not become *real* knowledge? The subject tends to be regarded as "facts to be stored" instead of as a medium in which the learning process can be exercised. In the reports of the Advisory Committees, and in this book, this point is stressed. Unless there are opportunities for experiences, for educing relations (*e.g.* comparing and contrasting), and possibly for educing correlates, the learning process will not be stimulated. Experiences in concrete situations seem possible.

We believe that a gF application of History would result in the acquisition of real knowledge.

In some schools this application is made in one form or another. At the Exhibition of English Education at Oxford a few years ago, one Senior Girls' school exhibited women's clothes throughout the ages. Figures of stout plywood were cleverly draped. These figures seemed more effective than the dressed dolls seen elsewhere, because dolls have not adult proportions, and style cannot so easily be shown on them. A Senior Boys' school showed a series of wooden models of ships, beautiful replicas of vessels used from early times to the present day.

Our own most successful venture in Applied History was with a top A class of boys which for some years studied the History of Architecture. In the earliest lessons some oral teaching was given and it was followed by the boys making

sketches and notes. Journeys were then made to (*a*) buildings having neo-Grecian pillars of various orders, (*b*) a church of chiefly Norman (Romanesque) architecture, with some Saxon work, (*c*) a cathedral in which there were examples of all three types of Gothic architecture, (*d*) an Elizabethan manor-house, (*e*) other churches, to identify work. Before each visit, permission to sketch in the church was sought from the appropriate authority, and was always willingly given. At the visit, each member of the class was instructed to make sketch-notes (*i.e.* to sketch half a window or half an arch) of some particular feature. For example at the cathedral one boy made sketch-notes of the Decorated Gothic window on the west front, another of a Perpendicular Gothic window in the south transept, another of the Early English window in the north transept. One sketched the nave arcading, another the triforium, yet another the clerestory, and so on. For later lessons the sketch-notes were pooled and every member of the class made a complete graphic study of the church and then wrote notes. Drawings in the note-books were made in Indian ink. Groups of boys measured up some of the smaller churches visited, and produced models of them that were replicas made to scale and coloured. In this work they used an altimeter (referred to in the chapter on Mathematics).

This type of work in History stimulated much conversation and much searching in the books available in the school reference library. It was noticed that boys from this class, on their way to football and cricket matches, as they passed through villages invariably observed and commented upon the architecture of the village churches.

A teacher's lack of specialised knowledge need not deter him from introducing the study of the History of Architecture to a class. Our own approach was made at first by keeping a little ahead of the class, and later by extending to a wider reading and search. The knowledge one acquires appears to be real knowledge, for it remains, so that ever afterwards historic buildings tell one a story. A list of books is given at the end of *A History of Everyday Things in England.*[1]

The value of Dramatics as a gF application of History needs

[1] *A History of Everyday Things in England*, by Marjorie and C. H. B. Quennell (Batsford), Vols. I to IV.

no stress. Younger children will act spontaneously stories they have heard. Older children can prepare dramatic work by learning speaking parts and making properties. Most of our readers will know of the plays of Mr. L. du Garde Peach. Puppetry, too, is used by some teachers for the dramatic presentation of History.

2. Geography

In many schools work in Geography is given a practical everyday application. The methods are often visual and the exercises present problems in concrete situations. In other words, the work is on gF lines. The specialist teacher of Geography will find in this chapter little or nothing that is new. This book is, however, written for the ordinary teacher who makes no claim to special knowledge but who must teach subjects that are in some schools the preserve of the specialist.

(a) *Feeble-minded Children.*—We do not know whether or not organised work in Geography is worth while for children of this intellectual level. We know of no Special (M.D.) School in which Geography as such has a place in the time-table. For some years incidental work in Geography has been done at Lankhills. This has consisted of—

(i) study of the map of the county, noting the home towns and villages of the children and the occupations of residents,
(ii) with older boys the marking on blank maps of England of the situation of towns having league football teams, and discussion of the reasons for the existence of these towns, and
(iii) study of world maps and of the globe to find places in the news.

The third attempt in twelve years to teach Geography, with periods allocated to the subject on the time-table, is now in progress with the older children. If the result is the acquisition of real knowledge, the venture will be continued and perhaps extended.

(b) *Children Dull in Less Degree* (Class C level, I.Q.s 75+). —Our experience is that children of this level can learn Geography if it is on simple practical everyday lines.

For younger children the subject was treated in very broad outline by studying the lives of children in other lands, by means of many pictures, the children seeing and then making models ; by some reading by the children themselves, and by contrasting life in other lands with life as the children know it. It will be appreciated that younger dull children do not easily grasp fine relationships, and they appear to understand contrast and wide differences more easily than comparison.

Older children after brief talks about the globe were provided with large cyclostyled blank maps of the world on which they massed in quickly world zones, first Climatic, then Vegetation. Specific articles of food, clothing, and other commodities, *e.g.* bread (for wheat), meat, margarine, woollen stockings, cotton shirts, tea, sugar, rice, etc., were then taken as centres of interest, and the natural regions of world production of the raw materials were massed in on blank maps and studied. These natural regions were linked to our own country by trade routes, and distances were treated in terms of weeks and days of steamship travel. Some simple weather observations were made and recorded by these children. Surveys of fields (using a sight-rule—see chapter on Mathematics) were made.

(c) *Children of Middle gv Ability and Just Over* (Class A level). —Similar gF methods we have found successful with these brighter children. For them work can be more detailed but the same visual and concrete approach seems sound.

With a top A class the natural regions of the world producing food and raw materials were studied. Blank maps of the world were massed in by children (the action of doing this massing-in appears to assist memory). With these brighter children much more attention was paid to—

(i) effects of local conditions of altitude and prevailing winds on production,
(ii) the human factor affecting production,
(iii) countries, cities, and ports,
(iv) trade routes.

These brighter children obtained much from the directed study of atlases, from independent study of books, and from note-making.

Regional surveys were made. An account of the study of

a local moor in which two groups using prismatic compasses and chains made maps, one group making a geological survey and one group a botanical survey, is given in the chapter on Mathematics. Local farms were surveyed and the cropping recorded for three successive years. Farmers readily gave permission for the surveys to be made, and were given each a copy of the plan that was made. *An Introduction to Regional Surveying* [1] may be helpful to teachers introducing this activity.

Much map study was done, using world maps, maps of countries, and Ordnance Survey maps of the locality. School journeys were made to places of interest. The course of a river was mapped (prismatic compass survey). Finding the width of the river by triangulation and the speed of flow in different places gave interesting exercises. Visits to local factories and works were made and sources of raw materials as well as processes were studied.

Methodical records of weather observations were kept. The rota of individuals who were detailed to record the readings of the various instruments was drawn out weekly over a period of some years by a member of the class. The activity, once commenced, continued without the teacher's interference. A rain gauge (home made), a maximum and minimum thermometer, wet-and-dry bulb thermometers, a barometer, a weather-vane, and an anemometer (for wind speeds) were all used. Readings were recorded in columns on a sheet of paper on the classroom wall. Each month every member of the class recorded the readings graphically in his note-book, traced relationships between the readings, and made deductions.

The argument in favour of using gF methods in Geography in a Senior School is that only if the subject is given a relationship to everyday things and to everyday life will the study of it result in the acquisition of *real* knowledge by Senior School children. The brightest children of all, the 10% or so who reach the Secondary Schools, may learn Geography by gv methods. Possibly for them too some practical application is desirable.

[1] *An Introduction to Regional Surveying*, by C. C. Fagg and G. E. Hutchings (Cambridge University Press).

POSTSCRIPT

SINCE this book was written two interesting observations have been made by Mr. A. J. J. Ratcliff, M.A., on the occasion of a visit to Lankhills.

1. As a result of the skimming of higher gv abilities that has occurred over generations through migration from the country to the towns, is it not possible that the residual rural population may be a reservoir of high gF ability?

If this is so, it explains the level and distribution of gF ability at Lankhills—which are the same as for normal children ; it also explains the remark made some years ago by an eminent psychologist. He found the standards of educational attainment reported at Lankhills to be incredibly high for any mentally defective children, but he added cautiously that the experience of psychologists was generally with urban M.D. children and that rural M.D. children might be different. At that time there appeared to be no difference, because the only objective measurement used gave I.Q.s for mentally defective children that were the same for both groups. The implication of Mr. Ratcliff's observation is that the practical abilities (and therefore the potential attainments) of urban M.D. children may be lower than those of the rural children who form the Lankhills population. This appears to be a probability. It is hoped that our colleagues in big towns working with special school and senior school lowest stream children will measure their practical abilities and make known the results.

2. The most striking feature of all the work at Lankhills appears to me to be the *economy of effort* by children and teachers.

To account for this economy of effort Mr. Ratcliff drew attention to :

(*a*) the orderly Schemes and the fine grading of the exercises : these seem to *carry* the children progressively along.
(*b*) the practice in nearly all subjects of the individual child first making a plan or descriptive statement of the piece of

work being undertaken : this adds definition and strength to the child's purpose.

(*c*) the quiet rhythm of the child's actual working efforts : this means deliberation without fussiness—like a good farm-hand scything.

(*d*) the intentness of the *whole* child on his job : in country dancing the children's very limbs seemed to be thinking. There is the minimum of diversion by the teacher of the child from his own task.

(*e*) the excellence of the children's posture, whether at work or in casual moments : there was neither strain nor flabbiness, but a supple, athletic ease.

(*f*) Lankhills as a whole is a living, active organism, lending its forward-moving impetus to every child's efficiency : there is an atmosphere of alertness and achievement. The children have a *workmanlike* look.

APPENDIX

THE METROPOLITAN READING SCALE FOR INFANTS AND JUNIORS

A Test of Reading for Comprehension, by A. F. Watts, M.A.[1]

This reading scale will enable a teacher to determine a Mechanical Reading Age and a Comprehension Age for children of infant and junior schools.

1. Mechanical Reading Age

Direct the child under examination to read as far along the scale as he can till he has made altogether a total of four errors in word recognition. If he says *officer* for *official* it is an error, but if he says *kew-pon* instead of *koo-pon* it is not an error, at least not one in word recognition.

Suppose the child makes his first error in Sentence 9, his second in Sentence 10, and his third and fourth in Sentence 12. We calculate his Mechanical Reading Age as follows. We assume that he must be at least $5\frac{1}{2}$ years of age before he can begin to learn to read. We add to $5\frac{1}{2}$ years three months for every sentence attempted. This makes the Mechanical Reading Age for the child who is stopped at Sentence 12 : $5\frac{1}{2}$ plus (12 divided by 4) years = $5\frac{1}{2}$ years plus 3 years = $8\frac{1}{2}$ years.

The scale will not be of much use with bright seniors, because it will not allow them to show to full advantage over bright juniors, some of whom will get through to the end of the scale. But for slow seniors the scale will be found useful enough.

2. Comprehension Age

The questions set out opposite the sentences of the scale may be used as the basis of a group test as soon as children are able to answer questions on paper. Till then, children should be tested individually and orally.

The children will be instructed to read the questions one by one, and look for the answer in the sentence on the opposite page which has the same number. The answer chosen will be underlined. A time limit will be set of 40 minutes.

The Comprehension Age will be found by adding to $5\frac{1}{2}$ years the number of right answers divided by four. A child who gets 17 answers right will have a Comprehension Age of $5\frac{1}{2}$ years plus (17 divided by 4) years = $5\frac{1}{2}$ years plus $4\frac{1}{4}$ years = $9\frac{3}{4}$ years.

The Comprehension Age as a rule will prove to be about six months

[1] Reproduced by kind permission of Mr. Watts.

lower than the Mechanical Reading Age. In other words, the average child reads more than he can comprehend. Where the reverse is the case, the reason should be sought in lack of good teaching, in frequent changes of school, in long absence from school (for example through illness).

It should not surprise the reader that a child can answer a question about a sentence which he cannot read perfectly, since he may be quite intelligent enough to guess at the meaning, given a few clues in the form of words he *can* understand.

1. The dog got wet and Tom had to rub him dry.

2. He was a very good boy to give you some of his sweets.

3. My sister likes me to open my book and read to her.

4. Go away and hide behind that door where we found you just now.

5. Please don't let anyone spoil these nice fresh flowers.

6. The string had eight knots in it which I had to untie.

7. Wine is made from the juice of grapes which grow in warm countries.

8. Mary went to the grocer's and bought some sugar and some syrup.

9. Quench your thirst by drinking a glass of our sparkling ginger ale.

10. The people could scarcely obtain enough food to remain healthy.

11. Elizabeth had her hair thoroughly combed and her fringe cut.

12. By stretching up, George just managed to touch the garage ceiling.

QUESTIONS ON THE READING SCALE

UNDERLINE THE ANSWER WHICH YOU THINK IS RIGHT

1. It says that Tom rubbed the dog because he was . . . what?
   (*a*) Dry (*b*) Wet (*c*) Cold (*d*) Not well
2. The boy gave away some of his sweets; so it says he was . . . what?
   (*a*) Silly (*b*) Polite (*c*) Good (*d*) Happy
3. It says that when you open your book your sister likes you to do . . . what?
   (*a*) Shut it again (*b*) Read to her
   (*c*) Show her the pictures (*d*) Teach her to read
4. It says that we found you . . . where? Write down the three words that tell us.
   ....
5. It says that we do not want the flowers to be . . . what?
   (*a*) Fresh (*b*) Nice (*c*) Spoilt (*d*) Touched
6. What had I to do to the string?
   (*a*) Make 8 knots in it (*b*) Untie the knots
   (*c*) Make the knots tighter (*d*) Try to undo them
7. What kind of a drink does it say we get from warm countries?
   (*a*) Water (*b*) Milk (*c*) Wine (*d*) Grape-fruit juice
8. How did Mary get the sugar and the syrup?
   (*a*) She paid for it (*b*) Her mother paid for it afterwards
   (*c*) The grocer gave it to her (*d*) It doesn't say who paid
9. It says that ginger ale will stop you from being . . . what?
   (*a*) Quenched (*b*) Sparkling (*c*) Thirsty (*d*) Ill
10. It says that the people were . . . what?
    (*a*) Not very healthy (*b*) Very healthy (*c*) Ill (*d*) Very ill
11. How does it say that Elizabeth's hair was combed?
    (*a*) Not very well (*b*) Very well indeed
    (*c*) Quite well enough (*d*) It doesn't say
12. Did George touch the garage ceiling?
    (*a*) It doesn't say (*b*) Yes, but not easily
    (*c*) Yes, quite easily (*d*) Yes, but not every time

13. Father had a brief telephone conversation with my cousin Philip.

14. This coupon entitles you to a specimen piece of our delicious toffee.

15. The chemist could not suggest a satisfactory remedy for my headache.

16. Nobody recognised Roger in his disguise as a police official.

17. Leonard was engaged by the Irish Linen Association to act as their London agent.

18. Judged by his photographs your nephew is certainly a peculiar character.

19. The examiner was impatient when I hesitated over a difficult phrase in my reading.

20. Delicate individuals should gradually be accustomed to gentle physical exercise.

21. The musician whose violin was interfered with has our sincere sympathy.

13. Why did father use the telephone ?
(*a*) To give a message to Philip (*b*) To arrange to see him
(*c*) To ask him a question (*d*) To have a short talk with him

14. In this sentence, the word which tells you that I have a right to a piece of toffee is . . . what ?

15. What was it that the chemist could not do ?
(*a*) Sell me a medicine for my headache
(*b*) Tell me of a good cure for my headache
(*c*) Tell me of a good doctor for my headache
(*d*) Give me a list of medicines for headaches

16. It says that the people did not know Roger because he was . . . what ?
(*a*) Dressed up to look like somebody else
(*b*) A policeman in real life
(*c*) A stranger
(*d*) Usually out of sight

17. It says that the Irish Linen Association did . . . what ?
(*a*) Made Leonard an actor
(*b*) Helped him to get married
(*c*) Gave him a job in England
(*d*) Promised him a job in London

18. It says that the nephew was . . . what ?
(*a*) A queer sort of person
(*b*) Photographed by the judge
(*c*) A person of strong character
(*d*) Wrong in his head

19. What was it that the examiner did not like me to do ?
(*a*) Make mistakes (*b*) Read too fast
(*c*) Read without expression (*d*) Stop at the hard words

20. It says that weak people should only take to exercise . . . how ?
(*a*) Little by little (*b*) Only now and then
(*c*) After they have got strong (*d*) When the doctor says so

21. It says that when we heard about the musician's violin we were . . . what ?
(*a*) Pleased (*b*) Angry (*c*) Sorry (*d*) Excited

22. The soloist was not in a convenient position for seeing everyone in his audience.

23. Christopher omitted to acknowledge the receipt of Michael's annual subscription.

24. The secretary said there had been a substantial increase in the Society's expenditure.

25. The Borough Council decided to celebrate the occasion by organising a gigantic sports festival.

26. It is essential that engineering apprentices should acquire some good technical qualification.

27. Particulars of the careers of eminent men will be found in any good encyclopaedia or biographical dictionary.

28. Certificates of insurance will be issued to all policy-holders paying the necessary premium.

29. The ceremony ended, appropriately enough, with the Choir and Orchestra joining in the National Anthem.

22. It says the performer found that the people were placed . . . where ?
    (*a*) Where they could all be seen
    (*b*) Where some of them could not be seen easily
    (*c*) Where only a few of them could be seen
    (*d*) Where hardly any of them could be seen

23. Which of these things does it say about Michael ?
    (*a*) He paid and got a receipt
    (*b*) He paid but did not get a receipt
    (*c*) He did not pay but got a receipt all the same
    (*d*) He did not pay and he did not get a receipt

24. It says that the Society spent how much ?
    (*a*) Just a little more than before
    (*b*) A good deal more than before
    (*c*) Not much more than before
    (*d*) About the same as before

25. It says that the Borough Council made up their minds to celebrate . . . what ?
    (*a*) A special occasion (*b*) An organisation
    (*c*) A giant decision (*d*) A sports festival

26. Which of these does it say that an engineering apprentice needs ?
    (*a*) A trade certificate (*b*) Clever hands
    (*c*) A good knowledge of business
    (*d*) A knowledge of factory rules

27. It says that in the books mentioned you will find . . . which of these ?
    (*a*) All about what great men did
    (*b*) All about the journeys of great men
    (*c*) All about what kings and statesmen did
    (*d*) All about the journeys of kings and statesmen

28. Who does it say will get the certificate ?
    (*a*) The person who pays the premium
    (*b*) The insurance agent
    (*c*) The insurance company
    (*d*) The police

29. Write down the words in this sentence which tell you that it was the proper thing to end up with " God Save the King ".

....

30. It is both a newspaper which chronicles events and a magazine with the usual miscellaneous features.

31. The necessity for accelerating the work of the Economic Conference was repeatedly emphasised.

32. These documents constitute an authoritative record of a unique colonial enterprise.

33. Psychology is a science which seems to fascinate both the adult and the adolescent student.

30. Write down the two words in this sentence which mean *gives the news about what happens.*

....

31. Choose a word from column (*a*) and one from column (*b*) below, to tell (*a*) what the conference was about, (*b*) how people wanted to get on with it.

(*a*)	(*b*)
Trade	Faster
Politics	Not so fast
Education	More quietly
Peace	More sensibly

32. According to this sentence, which is correct?
(*a*) No one knows what really happened
(*b*) Only those who were there at the time know what happened
(*c*) It is now possible to read about what happened
(*d*) You have to go to the colonies to find out what happened

33. Which of the following is correct? Choose two kinds of people from column (*a*) and a subject from column (*b*)

(*a*)		(*b*)
Children	ARE	Logic
Grown-ups	INTERESTED	Human behaviour
Young people	IN	Health
Old people		Physics

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